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ABSTRACT

The pathways taken by minority Ph.D.s from graduate school into the labor market are examined with a focus on their destination and progress in academe. The emphasis is on: (1) the characteristics of Black, Hispanic, and Asian-American Ph.D.s from the general population of Ph.D.s, and how they differ among themselves; (2) general labor force participation, status, and career progress of minority Ph.D.s; (3) minority groups most likely to choose academe, and the extent to which there has been a structural career shift in career choices of new Ph.D.s over time; and (4) the current status and nature of minority recruitment in academe, with particular focus on academic type of appointments and work experiences, and promotion and tenure rates. Data from the study came from the National Research Council's Survey of Earned Doctorates and the Survey of Doctorate Recipients from 1975 to 1986. Minority underrepresentation in academe is attributed to slowdown in doctoral production, declines in applicant pools, decline in numbers choosing careers in academe, and lack of minority retention. Findings are reported in three areas: demographic characteristics and trends of minority Ph.D.s; minority Ph.D.s in the labor force; and minorities in academe. Policy directions are also recommended for enrollment enhancement, Black-White institutional consortia, fellowships and traineeships, applicant pool expansion, and faculty retention. Thirty-one tables are included. Contains 35 references. (SM)

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Increasing Minority Faculty: An Elusive Goal

Shirley Vining Brown

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INCREASING MINORITY FACULTY: AN ELUSIVE GOAL

by
Shirley Vining Brown

ERRATUM NOTICE

Please note that the source for data in Tables 3.5, 4.10, 5.4, 5.5A, and 5.5B is: National Research Council, Survey of Doctorate Recipients.

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Shirley Vining Brown

EXECUTIVE SUMMARY

Much attention has been given to the state of American higher education and to the college and university faculty members who are so critical to the development, change, and progress of higher education. In general, the faculty in higher education has been characterized as a "national resource imperiled"; moreover, there is increasing evidence that faculty from underrepresented* minority groups face an uncertain future on U.S. college and university campuses. The nation's minority college and university professoriate occupies an important role in contemporary higher education, and although higher education has made some progress in increasing their participation on traditionally White faculties, in recent years, the rate of this progress has waned and even reversed for Black faculty.

The need for more faculty from underrepresented minority groups is clear. Despite the enactment of affirmative action in the 1960s, full-time Black faculty positions decreased from 19,674 to 18,827 between 1977-1983, and the decline has been in both public (–6.2 percent) and private (–11.3 percent) four-year institutions. Moreover, in 1983, full-time Black faculty representation in traditionally White institutions was only 2.3 percent, and the American Council on Education's 1986 report on their status shows that their participation is declining in most states.

During the same time period, full-time Hispanic and Asian-American faculty have made progress, but at different rates. The former increased at the rate of 26 percent, from 6,505 to 8,311; the latter, by 38 percent, from 11,917 to 16,398.[1] Thus, experiences have been variable in academe among minority faculty, with Black professionals losing ground.

The purpose of this study is to examine the pathways taken by minority Ph.D.s from graduate school into the labor market, with special attention given to their destination and progress in academe. Specifically, this project:

- describes and disinguishes the characteristics of Black, Hispanic, and Asian-American Ph.D.s from the general population of Ph.D.s and determines how these minority groups differ among themselves.
- presents findings on the general labor force participation, status, and career progress of minority Ph.D.s.
- describes which minority groups are more likely to choose academe and the extent to which there has been a structural shift in career choices of new Ph.D.s over time.
- describes the current status and nature of minority recruitment in academe, focusing particularly on academic type of appointments and work experiences, and promotion and tenure rates.

Data for the study came from the National Research Council's Survey of Earned Doctorates (SED) and the Survey of Doctorate Recipients (SDR) spanning the years from 1975 to 1986. The analyses focus primarily on minority doctorates who were educated in U.S. secondary schools, although some analyses include doctorates who were naturalized U.S. citizens or who held permanent visas.

A major limitation of the analysis is that the SDR does not follow the postgraduate careers of doctorates in education or the professions; however, the downward trend of doctorates in these fields with plans in academe follows the general pattern observed for all doctorates.

Findings

Minority underrepresentation in academe has been attributed to three factors. First, among Asian Americans and Hispanics, it is associated with the slowdown in doctoral production, and within the Black community, to their real and relative declines in the doctorate pool. Second, among new minority Ph.D.s, the proportions choosing careers in academe is dwindling. However, a third aspect of the outflow is the lack of minority faculty

*In this study, "underrepresented minority groups" refers to Black and Hispanic men and women, whose proportions in graduate study are below their proportions in the general population.

[1]The percentages for Hispanic and Asian-American faculty increases were recalculated from data presented in the 1986 ACE report.

retention in academe. Thus, the problem of underrepresentation is one of supply, flow into and through the academic pipeline, and minority faculty retention.

The major findings of the report on minority doctorates are summarized below.

Demographic Characteristics and Trends of Minority Ph.D.s

- Since 1975, there has been a small increase in the number of minority Ph.D.s, but the increase is due entirely to increases in the number of Asian-American and Hispanic Ph.D.s. Although the numbers of Hispanic and Asian-American Ph.D.s are about equal, relative to their representation in the general population, Asian Americans are overrepresented and Hispanics are underrepresented in the pool. The number of Black Ph.D.s declined in absolute numbers and in proportion and shows no signs of recovery.
- Compared to earlier cohorts, new minority Ph.D.s in 1986 were older, were less likely to be married, had parents with higher levels of education, and except for Black Ph.D.s, were more frequently male than female. Subgroup differences reveal that Black Ph.D.s were the oldest, while Asian Americans were the youngest group. In 1986, there were more than one-and-a-half females (60.9 percent) to every Black male (39.1 percent) receiving the doctorate degree; however, males received the majority of doctorate degrees awarded to Asian Americans (65.8 percent) and Hispanics (54.2 percent). Black and Hispanic Ph.D.s were more likely to earn degrees in education and the social sciences, while Asian-American Ph.D.s primarily earned their degrees in engineering and the physical and life sciences.
- There is a positive shift toward more Ph.D.s taking postdoctoral study. Fewer than 11 percent of Black Ph.D.s, however, take such appointments. Asian Americans (47.5 percent), followed by Hispanics (19.2 percent), took postdoctoral appointments at higher rates, and Asian Americans continue to take them at rates that surpass the national average (22.1 percent).

Minority Ph.D.s in the Labor Force

- Almost all minority Ph.D.s were fully employed in 1985 and the majority were employed full-time in four-year institutions. However, there is a notable shift from academic to nonacademic employment plans between 1975 and 1986. Shifts away from academe were most apparent in fields other than the humanities.
- The field mobility of minorities in science and engineering (S/E) fields varied by race/ethnic group and by discipline. Retention rates (i.e., those doctorates who remained in their Ph.D. field) were highest for minority Ph.D.s in the computer sciences. In the humanities, the field of music had the highest retention rate, although Black professionals in art history, and English/American language and literature and Hispanics in speech and theater also tended to stay in their fields. Field mobility was highest in the "other" humanities.
- Compared to earlier cohorts, 1985 Ph.D.s were more likely to take jobs outside of their doctorate field, citing two primary reasons for doing so: (1) more attractive career options, and (2) the inability to find jobs in their field. Black and Hispanic professionals were more likely than Asian Americans to report that they were attracted to jobs outside of their doctoral field because of better salaries.

Minorities in Academe

- Between 1975 and 1985, there were incremental increases in minority Ph.D. appointments to full-time faculty positions. With the exception of Asian Americans, most minority appointments were in the social sciences and humanities departments. Asian Americans were as likely to be employed in the life sciences as in the social sciences.
- The median salaries for minority faculty were substantially lower than the salaries of comparable minority Ph.D.s in business and private industry. In academe, however, Black faculty generally earned higher salaries than members of other minority groups, except in engineering, where Asian Americans had the highest earnings. In the nonacademic sector, Black professionals earned salaries lower than other comparable groups.
- Teaching was the primary activity of Black and Hispanic faculty; they also more frequently reported being involved in administration. Compared to Asian Americans and Hispanics, few Black faculty were engaged in research. Asian Americans were most likely to report research as a primary activity and least likely to be in administration.
- Longitudinal tracking of minority faculty revealed that Black Ph.D.s had the lowest promotion and tenure rates among minority groups, and, except for promotions to associate professor rank, their rates were consistently below the national average. Asian Americans had the highest promotion and tenure rates, and both Asian-American and Hispanic faculty had promotion and tenure rates above the national average. Field was not controlled for in these analyses.

Recommended Policy Directions

The following recommendations are those of the author and not of the Graduate Record Examinations Board or Educational Testing Service.

The experiences of underrepresented minority Ph.D.s — Black and Hispanic — in academe reveal that current policies and practices are not working effectively and that other strategies must be employed to increase their participation. In particular, the improvement of precollege preparation of Black and Hispanic students is essential to their greater participation and retention in higher education:

- Policies to enhance underrepresented minority postsecondary enrollment must be placed at the top of the political agenda in state and national election platforms.
- To increase the Black and Hispanic doctorate yield, effective consortia between traditionally Black and predominantly

White institutions are needed to attract minority students into graduate programs directly after the baccalaureate degree. Similar consortia are needed to facilitate the attainment of the doctorate among Black faculty. Institutional commitment and adequate financial support are vital to successful consortia arrangements.

- National foundations and organizations should increase and adequately fund fellowships and traineeships to support underrepresented minorities who plan careers in academe.
- The pool of qualified doctoral candidates must not only be expanded, but Black candidates must also expand their career choices from low-growth to high-activity fields such as science and technology, where they are even more seriously underrepresented than in education and the social sciences.
- Colleges and universities must establish institutional initiatives to retain Black faculty through the winnowing processes of promotion and tenure.

The Issue

Since 1968, renewed attention has been given to the state of American higher education — its quality and quantity — and to the college and university faculty members who are critical to the development, change, and progress of higher education (Jencks and Reisman, 1968). In general, faculty in higher education have been characterized as a "national resource imperiled" (Bowen and Schuster, 1986). This is especially true for underrepresented minority faculty, where there is increasing evidence that these groups face an even more uncertain future on U.S. college and university campuses. The nation's minority college and university professoriate occupies an important role in contemporary higher education, and although there has been an increase in their participation on traditionally White faculties, in general the rate of progress for minority faculty has waned in recent years, and has even regressed for Black faculty.

The need for more faculty from underrepresented minority groups is clear. Despite the promulgation of affirmative action plans in the 1970s, Black full-time faculty positions decreased from 19,674 to 18,827 between 1977-1983, and the decline is apparent in both public (–6.2 percent) and private (–11.3 percent) four-year institutions. Moreover, in 1983, full-time Black faculty representation in White institutions was only 2.3 percent, and the most recent report on their status by the American Council on Education (ACE, 1986) shows that their participation is declining in most states.

During the same time period, Hispanic and Asian-American full-time faculty have made some progress, but at different rates. Hispanic full-time faculty increased at the rate of 26 percent, from 6,605 to 8,311 faculty; Asian-American full-time faculty increased by 38 percent, from 11,917 to 16,398 faculty. Thus, minority-group experiences are variable in academe, with certain groups increasing their share of faculty while Black professionals are losing ground (ACE, 1986).

As growth in the academic labor market levels off, the decline in Black full-time faculty is even more problematic and has several important implications. As educators, Black faculty have a special and direct influence on the attraction, recruitment, retention, and career development of future generations of minority scholars and professionals. As researchers and scholars, Black faculty make a unique contribution to the advancement of learning and culture in American society. The same is true for other underrepresented minorities. Future projections indicate that, with attrition through retirements in the late 1990s, the number of new openings in the nation's colleges and universities will expand (Bowen & Schuster, 1986). Thus, minority faculty are a major resource that the U.S. cannot afford to overlook if it is to increase the production of future generations of minority scholars and professionals.

Background Literature on Minorities in Academe

Concern over the lower participation of minority faculty in higher education gained impetus during the civil rights movement in the late 1960s and 1970s. The lack of such faculty results in a lack of role models which was, and continues to be, cited by Black and Hispanic students as one of the major reasons colleges and universities have difficulty recruiting and retaining non-Asian-American minority students (*Black Issues in Higher Education, 1987*). Many studies confirm the problems related to a lack of minority role models in higher education (Hochschild, 1974; Mommsen, 1974; Pruitt, 1981; Wilson, 1982; Blackwell, 1983). Blackwell, for instance, found that the presence of Black faculty is the most important factor in determining whether Black students earn degrees from predominantly White graduate and professional schools. Because of this linkage, he concludes that it is vitally important to expand the pool of Black faculty in all institutions. Moreover, predominantly White graduate and professional schools produce virtually all minority Ph.D.s, thus increasing the importance of Black faculty in these institutions. All of these studies conclude that, despite the general progress made toward increasing minority faculty, there is a critical shortage of Black faculty on college and university campuses.

What has caused the lack of parity for some race/ethnic groups on faculties in higher education? Multiple factors are at play here. There is a continuing debate over whether the shortage is due more to the insufficient supply of adequately trained Black and Hispanic scholars (Bowen and Shuster, 1986), or to the failure of institutions to carry out affirmative action plans in appointment and promotion procedures (Fleming et al., 1975). Both factors probably contribute to this shortage.

Although previous studies show no evidence of the erosion of post-civil-rights gains for Blacks, more recent evidence indicates a decline in Black participation in higher education, particularly at the graduate level (Brown, 1987). Thus, historical inequalities between Black and White groups are not likely to be eliminated in the near future (Blalock, 1983; Young and Young, 1976). Although some researchers argue that affirmative action policies will not have an impact on minority progress unless minorities acquire skills that allow them to compete with others in the applicant pool, they believe that strengthening affirmative action policies will provide an effective stance against 'gatekeepers' who might not otherwise hire even the best-qualified minority applicants (Blalock, 1983).

Quite apart from the polemics on the causes of the downturn, no one disputes that there has been a substantial decline in the Black doctorate pool during the 1980s. Among other reasons, there is growing evidence of a decline in interest in academic careers. For example, a study by Astin and others (1983) shows a steady decline in interest in college teaching and in scientific research careers among college freshmen. Brown's (1987) analysis of career field choices also reveals a definite shift in interest among all minorities toward fields such as business, which do not require doctoral training and which lead to higher labor-force participation after the baccalaureate degree. Data from the National Research Council (1986) on postgraduation commitments show that among new Ph.D.s there has been a definite shift from academe to other employment sectors since 1975. Even though academe still claims the largest fraction (48

percent) of Ph.D.s with confirmed employment plans, industry and government are taking an increasing share of new doctorates each year.

This declining interest in academe among undergraduates, especially among the highly talented (Astin et. al., 1983), comes at a time when openings for new faculty will become more plentiful as enrollments recover in the next decade from present declines (Bowen and Schuster, 1986). Minority students are expected to make up a larger fraction of the increased enrollment (Center for Statistics, 1986).

Labor-market forces such as salary levels and variations in field growth may play an important role in current academic employment trends. Hansen (1986) notes that changes in faculty salaries reveal both a dramatic decline from 1970 to the early 1980s in the real and relative earnings of college faculty and a widening dispersion in salaries across disciplines that has lowered faculty morale. Because colleges and universities are unable or unwilling to compete with the more attractive salaries being offered by private industry (*The Chronicle of Higher Education*, 1986), the higher incomes offered by other sectors may be an important factor in the shifting career choices of Ph.D.s away from academe. Salary considerations are probably more important to Black (and perhaps Hispanic) professionals, because they are older, have more dependents, and incur larger debts by the time they complete the doctorate (Zumeta, 1984).

Despite renewed interest in the lack of real progress in minority faculty representation on U.S. campuses, there is little empirical information on the nature and extent of their participation in higher education. For example, although the term 'minority' is used generically, little is known about the nature and extent of differences in subgroup experiences in academe, particularly between Black and Hispanic subgroups. Although most studies show that Asian Americans have experiences in academe more similar to their White counterparts than to other minorities, race/ethnic differences among other minorities are played down even though differences between these groups may be as great or greater than differences between each subgroup and the general population. Moreover, many studies focus solely on Black faculty, whose experiences provide a partial but incomplete picture of a situation that is far more complex than the unique experience of one group.

Nearly all studies exclude Asian Americans because their performance has been atypical of other minority groups. Even when other groups are included, typically the analysis is restricted to comparing the percentage of full-time faculty and their rates of change over time (ACE, 1986).

There is one study in progress that is examining more substantive issues, such as the attitudes and perceptions of Black faculty concerning their experiences in predominantly White institutions (Silver, Dennis, and Spikes, forthcoming). The literature reveals no longitudinal studies that examine the comparative progress of Black, Hispanic, and Asian-American groups in the promotion and tenure system.

Purpose of This Study

The purpose of this study is to assemble the facts about the nature and change in minority doctorate trends and to examine faculty recruitment and retention patterns among minority groups. The key questions guiding the analyses were:

- Is the minority doctoral pool changing, and if so, what is the nature and trend of these changes?
- What trends are developing in the postdoctoral career choices of minority Ph.D.s? What employment sectors are competing with academe for new minority Ph.D.s?
- What are the experiences of minority Ph.D.s who enter academe?

The study answers these questions for Black, Hispanic, and Asian-American doctorates who planned to enter or were already in the postgraduate civilian labor market in 1985. Furthermore, it provides a comparative demographic and career profile of the minority doctorate pool. It examines trends in the postgraduate employment plans and the various pathways taken by minorities from graduate school into the labor market. Special attention is given to Black, Hispanic, and Asian-American experiences and their career progress in academe.

The Organization of the Report

Following this chapter, Chapter II presents information on the data and methodology used, the sample, and the limitations of the data. Chapter III presents the findings on the personal and background characteristics of minority doctorates. Chapters IV and V describe the flow of minorities into the civilian labor market, first by looking at their career plans, actual employment choices, and field mobility; and second, by observing race/ethnic differences in their experiences in academe by describing type of appointments, relative earnings, primary work activity, academic rank, and promotion and tenure rates. The final chapter presents the conclusions and policy recommendations for increasing and retaining minority faculty in higher education.

Data and Method

Data for this study came from two National Research Council Surveys: the Survey of Earned Doctorates (SED) and the Survey of Doctorate Recipients (SDR). Information on the supply, characteristics, and plans of new doctorates, spanning the years from 1975 to 1986 was obtained from the SED, which is an annual survey of new Ph.D. recipients in all fields from U.S. institutions.

Covering the period from 1975 to 1985, information on career progress and related issues derived from the SDR, a biennial survey that provides cross-sectional and longitudinal career data on a 10 percent sample of science, engineering, and humanities doctorates. The 1985 survey contained approximately 79,000 individuals who graduated between 1944 and 1984, and who resided in the United States in February 1985. The sample was stratified to ensure the inclusion of all significant subpopulations. The sampling procedure (i.e., weighting procedure, response rates) is further explained in Appendices A through E. (Note: The appendices are available separately and are not included in this report.) The estimates reported from the SDR are weighted estimates for each group.

In this study, only Asian-American, Black, and Hispanic Ph.D.s are included in the analyses, with White and the total doctorate population used for comparative purposes. Because the number of Hispanic Ph.D.s was not large enough to reliably break out by sub-ethnic group (for example, Mexican-American and Puerto Rican), each subgroup was merged into the Hispanic category. The number of American Indians and minorities classified as "other" was also too small to be included.

Where possible*, only Ph.D.s who were educated in U.S. high schools are included in the sample in order to restrict, as much as possible, broad cultural variations in the education of individuals from different countries and to focus on the progress of doctorates who came through the U.S. educational pipeline. This restriction increases the probability that the samples include primarily Black and Hispanic (for example, Mexican-American and Puerto Rican) Ph.D.s who are native-born U.S. citizens.† The term "Ph.D." is used interchangeably with the term 'doctorate' throughout this report, even though there are various types of doctorates (e.g., Ed.D., DSW, Th.D.). While a higher percentage of Blacks and Hispanics have doctorates in education and professional fields, 86.2 percent of all doctorates awarded in 1986 were Ph.D. degrees.

The first phase of the career analysis draws on data from the SED to describe trends in the postgraduate plans of new Ph.D.s in all fields at the time of degree completion. The second phase draws on the SDR data and focuses on the field mobility and progress of minority faculty, but only for Ph.D.s who earned degrees in the sciences, engineering, and humanities and who were in the civilian labor force in 1985. Doctorates in education and the professional fields are not included in the SDR sample. The SDR permits a closer investigation of Ph.D. employment in academe. We used SDR data for cross-sectional analyses to describe minority faculty appointments and primary work experiences and for longitudinal analyses to trace and compare faculty advancement over time in terms of promotion and tenure.

Limitations of the Study

There are five major limitations to the data. First, the sample for the SDR does not include doctorates in education and the professional fields. This omission is particularly significant in assessing the postgraduate experiences of the Black and, to some extent, the Hispanic doctorate pool. Over half of all Black doctorate degrees and almost a third of all Hispanic doctorate degrees were in the field of education. At best, we can only determine from the SED the percentage of Black and Hispanic Ph.D.s who planned careers in academe and observe that the percentage choosing academe has declined since 1975. Because education doctorates are a large segment of the Black doctorate pool, data on promotion and tenure outcomes in this field are needed to more precisely evaluate the current shortfall among full-time Black faculty.

Second, by restricting the analyses to doctorates who were educated in U.S. high schools, the numbers of Asian Americans and Hispanics in each sub-ethnic group were too sparse to provide meaningful findings. Thus, their relative contributions cannot be fully assessed by the data and may not precisely describe the experience of doctorates in specific Asian American and Hispanic sub-ethnic groups. For Hispanics, however, the 1986 SED survey shows that, with few exceptions, Puerto Rican and Mexican-American U.S. doctorates have quite similar distributions on such variables as their demographic characteristics, career field choice, post-doctoral plans, median total and registered time from B.A. to Ph.D. degree, and employment status at receipt of Ph.D.

Third, while the data base contains information on trends and patterns in various outcomes, except for the responses of doctorates who were working in part-time jobs and outside of their specialty, it does not have information on the reasons why the outcomes occurred. Thus, aside from showing that there are distinct group differences, we cannot explain why promotion and tenure rates differed among race/ethnic groups.

Fourth, because one-third of all Black Ph.D.s are employed in traditionally Black institutions and the analysis does not disaggregate Black participation by type of institution (i.e., traditionally Black versus predominantly White), we do not know what effect this may have on the promotion and tenure rates reported in this study.

Finally, we do not have standard errors and, therefore, cannot always be sure that observed percent differences are statistically significant.

*In some analyses, data on U.S. citizens, which includes naturalized citizens and, in some cases, those with permanent visas, had to be used. Analyses based on this sample are not strictly comparable to analyses based on the sample of Ph.D.s who were educated in U.S. secondary schools.

†In other analyses of the SED survey data, the author found almost no difference between the sample N of native-born and U.S. high-school-educated Black and Hispanic Ph.D.s.

For several decades there has been an increase in the number of individuals seeking advanced degrees in U.S. colleges and universities. In the 1960s, the removal of financial and racial barriers permitted minorities to keep pace with this trend, which was reflected in rapidly growing minority enrollments at all levels of the higher education system. The expansion of advanced study has had a major effect on the caliber of the available pool of new faculty for academe, and employing institutions have become more selective in their hiring practices (Bowen and Schuster, 1986; Fleming et. al., 1975).

For example, between 1950-51 and 1984-85, there was a sharp increase in the proportion of Ph.D.s serving as full-time faculty from 37 to 62 percent. This trend is of concern to policy analysts (Blackwell, 1983; Fleming et. al, 1978) who view a highly competitive employment market, coupled with the recent attrition of minorities in higher education, as a combination of factors that work against achieving parity for minority faculty.

Since 1975, the number of Black doctoral awards has declined. Current demographic trends in the educational pipeline are expected to lead to further declines in the size of the Black Ph.D. pool that could result in a future supply of minority faculty that will be inadequate to maintain the status quo, let alone to achieve parity. This chapter examines minority doctorate cohorts to determine trends in the size and characteristics of the primary pool from which minority faculty are recruited.

Specifically, this chapter addresses the following questions:

- What are the personal characteristics and field choices of minority Ph.D.s?
- Are their characteristics and choices different from those of the general population of Ph.D.s?
- Do minority group Ph.D.s differ among themselves on these characteristics, and, if so, what is the nature and extent of these differences?

Using data from 1975 to 1986 from the Survey of Earned Doctorates (SED), we present a profile of each minority group.

Size of the "New" Doctorate Pool

Since 1975, the number of minorities earning Ph.D.s has increased steadily while the number of White Ph.D.s has declined. Nonetheless, in 1986, the relative percentage (8.4 percent) of Black, Hispanic, and Asian-American groups in the pool represented less than a 30 percent increase over their share (6.1 percent) of the pool in 1975. Table 3.1 summarizes the growth rates among White as well as minority groups. It presents the varying subgroup contributions to the increase, as well as the slight shifts in subgroup shares of the total pool. The Asian-American and Hispanic proportions have risen, while Black proportions have declined. Hispanic doctorate awards increased by 87 percent after recovering from a downward trend between 1978 and 1981. Asian-American shares have advanced steadily and, by 1986, increased by 84 percent. The Asian-American and Hispanic pools were about the same size; but relative to their proportions in the general population (1 and 8 percent, respectively), Asian-American doctorates were overrepresented and Hispanic, underrepresented in the pool.

Table 3.1: Race/Ethnic Status of Ph.D.s: U.S. Citizens*, 1975-86

Year of Doctorate	Numbers of Ph.D.s			
	Black	Hispanic	Asian-American	White
1975	999	303	286	24,352
1976	1,095	340	344	24,373
1977	1,116	423	339	23,065
1978	1,033	473	390	21,811
1979	1,056	462	428	21,920
1980	1,032	412	458	21,993
1981	1,013	464	465	21,979
1982	1,047	535	452	21,674
1983	921	538	492	21,673
1984	953	535	512	21,321
1985	909	559	515	20,641
1986	820	567	527	20,538
	Percent of Ph.D.s			
1975	3.8	1.2	1.1	93.7
1976	4.2	1.3	1.3	93.1
1977	4.5	1.7	1.4	92.2
1978	4.3	2.0	1.6	91.8
1979	4.4	1.9	1.8	91.5
1980	4.3	1.7	1.9	91.8
1981	4.2	1.9	1.9	91.6
1982	4.4	2.2	1.9	91.1
1983	3.9	2.3	2.1	91.4
1984	4.1	2.3	2.2	91.1
1985	4.0	2.5	2.3	90.9
1986	3.6	2.5	2.3	89.4

*Excludes other races and no-report cases of doctorate recipients reporting race/ethnic status.

Source: National Research Council, Office of Scientific and Engineering Personnel, Survey of Earned Doctorates, 1975-1986

Black graduates continued to claim the largest share of doctoral degrees awarded to minorities; however, they lost considerable ground in doctoral production during the decade. The sharpest decline (26.5 percent) took place from 1977 to 1986, when the number of Black doctorates fell from 1,116 to 820. In relative terms, their share of the pool peaked in 1977 (4.5 percent); by 1986, the irregular but steady downward trend shows that the Black doctoral pool had reached its lowest level in over a decade and shows no sign of recovery.

When Hispanic and Asian-American Ph.D.s are considered separately, they took the smallest fraction of all doctorates awarded each year. But, when their 1986 gains are combined (4.8 percent), Hispanics and Asian Americans took a larger fraction of the doctoral awards than did Blacks (3.6 percent), who represent about 12.1 percent of the U.S. population.

Characteristics of the Minority Ph.D. Pool

Because minorities are an emergent faculty group within higher education (Bowen and Schuster, 1986), there is little information on their personal and background characteristics. The SED provides self-reported information from respondents on several characteristics that distinguish minority groups from the total population of Ph.D.s as well as from each other.

Sex Composition of the Pool: 1975-1986

Men have traditionally dominated the Ph.D. pool. Even though women increased their share of doctorates by 39.2 percent between 1976-1985 (National Research Council, 1986), men claimed the largest share of all degrees awarded each year (Table 3.2). Over the years, a definite shift in the male/female proportions of the Black doctorate pool has emerged. After a slump in 1977, by 1980 Black women had substantially increased their share of doctoral degrees. This marked the first year that the majority balance tipped to favor women. Thereafter, steady increases in the proportion of Black women Ph.D.s has grown to the point where, in 1986, they received almost 61 percent of all doctorates awarded to Black candidates — thus almost doubling their proportional representation within a decade. This occurred at a time when the entire pool was reduced from 1,116 to 820.

Table 3.2: Sex Distribution of Ph.D.s, by Race/Ethnic Status: U.S. Citizens*, 1975-1986 (in percent)

Year of Doctorate	Black		Hispanic		Asian-American		White	
	Women	Men	Women	Men	Women	Men	Women	Men
1975	34.9	65.1	20.1	79.9	22.4	77.6	23.5	76.5
1976	40.5	59.5	25.6	74.4	26.9	73.1	24.6	75.4
1977	38.7	61.3	26.7	73.3	26.0	74.0	26.2	73.8
1978	43.5	56.5	33.0	67.0	26.4	73.6	28.6	71.4
1979	47.8	52.2	33.3	66.7	27.3	72.7	30.4	69.6
1980	51.6	48.4	37.9	62.1	31.7	68.3	32.5	67.5
1981	50.7	49.3	40.7	59.3	32.3	67.7	34.2	65.8
1982	53.9	46.1	35.7	64.3	37.8	62.2	35.5	64.5
1983	55.3	44.7	46.5	53.5	36.6	63.4	37.3	62.7
1984	55.2	44.8	41.5	58.5	34.0	66.0	38.3	61.7
1985	58.4	41.6	46.7	53.3	36.3	63.7	38.2	61.8
1986	60.9	39.1	45.7	54.3	34.2	65.8	40.3	59.7

*Includes non-U.S. citizens with permanent visas.

Source: National Research Council, Survey of Earned Doctorates,1975-1986.

Among Hispanics, men still claim the largest proportion of doctoral awards, although a sex-ratio pattern similar to that of Blacks might be developing. Since 1982, there has been a converging trend in the proportions of Hispanic women and men who earned Ph.D.s.

The Asian-American male-female ratio, which is quite similar to that of the White ratio, is nearly 2 to 1. Since 1975, however, Asian-American women have increased their share of Ph.D.s in the Asian-American pool.

Median Age at Attainment of the Doctorate

Trend data show that the Ph.D.s in 1985 were typically older than earlier cohorts when they completed their doctorates (Table 3.3). Hispanics had a median age close to the national average, while Black Ph.D.s were older and Asian Americans younger than average. In general, the median age of new Ph.D.s in 1985 was about two years older than for new doctorates in 1975. Asian Americans, who were the exception, were younger than other Ph.D.s and their median age remained fairly stable during this period.

The median age also varied according to type of institution. Doctorates who were planning to work in four-year colleges and universities were slightly younger than Ph.Ds who accepted offers from two-year institutions.

Age differences between minority Ph.D.s are partially accounted for by the total *elapsed* time from the baccalaureate to graduate school, as opposed to actual *registered* time, which is similar for minority and White Ph.D.s (Pearson, 1986). Asian Americans have the highest proportions of students who begin graduate study immediately after receiving the baccalaureate degree. At the other extreme, earlier studies show that a higher percentage of Black students begin graduate study after a delay of nine or more years after receiving the baccalaureate degree (Gilford and Snyder, 1977).

Table 3.3: Median Age of Minority Ph.D.s with Confirmed Plans to Enter Academe by Type of Institution: U.S. Educated, 1975-1986

Year	Four-Year Institutions			
	Black	Hispanic	Asian-American	U.S. Total
1975	35.1	32.8	31.2	31.9
1976	34.8	32.6	31.7	32.1
1977	34.2	32.1	29.0	32.0
1978	35.6	33.1	29.8	32.1
1979	35.0	33.9	29.4	32.1
1980	36.0	33.0	30.3	32.7
1981	37.0	33.8	31.1	32.9
1982	36.8	34.3	31.5	33.2
1983	35.6	34.2	33.7	33.4
1984	37.4	34.4	29.8	34.0
1985	36.8	35.3	31.1	34.3
1986	36.9	34.7	32.9	34.8
	Two-Year Institutions			
1975	39.0	37.0	30.0	35.9
1976	39.8	40.3	38.0	37.3
1977	40.5	34.0	39.0	36.8
1978	38.3	33.8	–0–	37.6
1979	43.0	38.3	–0–	37.8
1980	37.4	39.0	–0–	38.7
1981	46.8	38.3	–0–	38.9
1982	41.0	38.0	–0–	38.5
1983	41.0	35.5	–0–	39.2
1984	43.0	36.8	–0–	39.4
1985	37.2	40.1	–0–	40.2
1986	41.0	39.0	41.0	41.6

Source: National Research Council, Survey of Earned Doctorates, 1975-1986.

Marital Status

Since 1975, the marital status of minority doctorates going into academic employment changed. Generally, marriage was less common among 1986 doctorates than it was among comparable cohorts 10 years ago, and minorities were less likely than the general population of doctorates to be married at the time of receiving their degrees (Table 3.4). Other analyses of these data revealed that doctorates with nonacademic employment commitments were slightly less likely to be married upon the receipt of the doctorate, particularly among Asian-American doctorates.

Parents' Educational Attainment

In 1986, Asian-American Ph.D.s were more likely than Hispanic or Black Ph.D.s to have fathers with some college, graduate, or professional education, and postdoctoral training (Table 3.5). This is a dramatic change for Asian Americans from 1975 (1.2 percent) to 1986 (20.9 percent). In this respect, the Asian-American pattern is more like the national average, although, in 1986, they far exceed the national rate for fathers holding

Table 3.4: Marital Status of Minority Ph.D.s with Confirmed Plans To Enter 4-Year Colleges/Universities: U.S. High School Educated, 1975-1986 (in percent)

	Married			
Year	Black	Hispanic	Asian-American	Total U.S. Pop.
1975	71.1	76.3	64.7	73.2
1976	64.5	74.8	56.5	71.9
1977	64.9	69.7	65.3	69.2
1978	63.6	63.3	51.2	65.4
1979	57.2	70.4	56.1	65.4
1980	57.2	70.4	56.1	64.2
1981	64.5	66.4	45.8	63.6
1982	57.0	66.0	45.8	63.0
1983	58.3	62.6	64.3	66.2
1984	58.4	64.8	46.2	62.3
1985	54.9	56.3	47.4	62.2
1986	51.2	58.0	51.2	62.0

Source: National Research Council, Office of Scientific and Engineering Personnel, Survey of Earned Doctorates, 1975-86.

Table 3.5: Educational Attainment of Parents of Minority Ph.D.s with Confirmed Employment Plans in 4-Year Colleges/Universities: U.S. Educated, 1975 and 1986 (in percent*)

	Fathers			
Year/Educational Level:	Black	Hispanic	Asian-American	Total U.S. Pop.
1975				
High School or less	75.8	76.8	65.5	55.1
1-3 Yr. College	9.0	7.6	13.7	13.7
4 Yr. College	7.4	8.5	13.7	16.0
M.A./M.D.	7.2	5.9	5.9	10.7
Ph.D./Postdoct.	.6	1.2	1.2	4.5
1986				
High School or less	59.9	54.9	46.5	41.7
1-3 Yr. College	7.2	9.4	2.3	13.8
4 Yr. College	10.0	12.3	23.3	19.0
M.A./M.D.	9.1	15.2	4.7	14.9
Ph.D./Postdoct.	4.3	5.0	20.9	8.0
	Mothers			
1975				
High School or less	70.6	80.5	74.6	59.3
1-3 Yr. College	11.8	6.8	7.8	18.0
4 Yr. College	11.5	8.5	13.7	15.8
M.A./M.D.	5.6	2.5	3.9	6.2
Ph.D./Postdoct.	.5	1.7	–0–	.7
1986				
High School or less	61.2	55.3	30.8	40.6
1-3 Yr. College	6.9	10.7	7.7	14.1
4 Yr. College	12.2	12.5	30.8	20.3
M.A./M.D.	8.4	16.1	7.7	14.6
Ph.D./Postdoct.	3.9	1.8	23.2	7.8

*Percentages do not add up to 100 because no report cases are excluded.

Source: National Resource Council, Survey of Earned Doctorates, 1975 and 1986.

advanced degrees. Higher proportions of Hispanic and Black Ph.D.s had fathers who attained less than a high school education or whose terminal degree was the high school diploma; in contrast, proportionally fewer members of these groups had fathers with some college training or advanced degrees.

Until 1986, Black Ph.D.s were the only group with better-educated mothers than fathers, if one considers the slightly higher proportions of fathers with a high school diploma or who had less than a high school education. In general, however, the mothers of all minorities were somewhat less educated than the fathers, although the educational attainment of both parents rose over the decade.

Field Specialties

Minority distributions among various doctorate field specialties are usually measured as a percentage of doctorate degrees earned, an indicator that could be misleading, because it does not account for the changing race/ethnic composition of the total doctorate pool over time. For instance, between 1975 and 1986, the proportion of total doctorates slightly declined from 3.8 to 3.6 percent for Blacks, but rose from 1.2 to 2.5 percent for Hispanics and from 1.1 to 2.3 percent for Asian Americans. Table 3.6 presents two measures that describe:

- each subgroup as a percentage of all U.S. doctorates, and
- the percentage of earned doctorates in a given field earned by the subgroup

These interest indices for 1975 and 1986 show that Black interest declined in the physical sciences, a field where the shortage of Black doctorates is most severe. Furthermore, by 1986 Black interest and overall participation relative to participation in the doctoral pool remained relatively high in only three fields: the professions/other group, the social sciences, and education. Although their actual numbers declined in education, Black professionals were still concentrated in this field.

The relative growth of Hispanics, whose proportional representation in the overall pool has risen since 1975, has declined in the physical sciences, engineering, life sciences, and education (where like Blacks, they were overrepresented). In addition to education, they were concentrated in the social sciences and the humanities, where their participation remained fairly stable.

Like their foreign counterparts, Asian Americans were concentrated in the physical sciences, life sciences, and engineering, although their participation in engineering dropped somewhat from 1975. Asian-American participation also fell slightly in the humanities, education, and in the Professions/Other category.

Summary

Using data from the National Research Council's Survey of Earned Doctorates, this chapter described changing trends in the personal characteristics and field specialties of minority doctorates. Asian Americans and Hispanics accounted for virtually all of the increase in the minority share of the Ph.D. pool. Black and White Ph.D.s have witnessed both absolute and proportional declines in their share of the pool since 1977, with Black declines being most severe.

The profile of minority Ph.D.s presents a picture of similarities and contrasts. For example, compared to the Asian- American and Hispanic pools, the national pool of Black Ph.D.s is shrinking. Moreover, new Black Ph.D.s are more likely than other minorities to be female, older at receipt of the doctorate, married, have parents who are among those with the lowest

Table 3.6 Interest Trends for Minority Ph.D.s by Broad Field: U.S. Citizens, 1975 and 1986

Year & Race/ Ethnic	% of All Docts.	Phy. Sci.	Eng.	Life Sci.	Soc. Sci.	Hum.	Prof./ Other	Educ.
1975		% Ph.D.*	% Ph.D.	% Ph.D.	% Ph.D.	% Ph.D.	% Ph.D.	% Ph.D.
Black	3.8	1.5	.8	1.9	3.2	2.5	2.5	7.9
Hispanic	1.2	1.0	1.0	1.1	1.2	1.5	.6	1.5
Asian-American	1.1	1.1	3.0	.9	.6	.8	1.2	.6
1986		% Ph.D.	% Ph.D.	% Ph.D.	% Ph.D.	% Ph.D.	% Ph.D.	% Ph.D.
Black	3.6	.8	1.0	1.5	3.6	2.6	4.5	7.5
Hispanic	2.5	1.8	1.8	1.7	2.8	2.8	1.7	3.4
Asian-American	2.3	3.6	5.8	3.5	1.5	1.1	2.2	1.0

* % Ph.D. = the percent of Ph.D.s in a given field earned by that subgroup.

Source: Data from National Research Council, Survey of Earned Doctorates, 1975 and 1986.

educational attainment, and earn their doctorates primarily in education, the social sciences, and in fields in the Professions/ Other category.

In contrast, Ph.D.s in the Hispanic pool are more likely than Black Ph.D.s to be male (although the gap is closing), to have a median age closer to the national average, are more likely to be married, and have parents among those with the lowest educational attainment. Hispanic Ph.D.s earn their degrees primarily in the humanities, education, and the social sciences, where they are concentrated, and are showing a slight growth in the Professions/Other group.

The Asian-American pool has grown steadily and is about the same size as the Hispanic pool. Asian Americans, however, are overrepresented and Hispanics are underrepresented in the doctorate pool in proportion to their representation in the general population. The typical Asian-American doctorate is considerably more likely than Black doctorates to be male, younger at receipt of the doctorate, single, have parents with an educational attainment higher than the national average, and to earn the doctorate in the fields of engineering, physical sciences, and the life sciences.

In spite of subgroup differences, all minority groups are becoming older than earlier cohorts when they receive the doctorate. At the same time, marriage is becoming less common. Overall, the educational attainment of the parents of minority Ph.D.s has risen. However, Asian Americans continue to lead their Hispanic and Black peers in the percentage of parents with some college education and advanced-level degrees. Minorities have varying degrees of participation in career fields. Although the actual number of Asian-American and Hispanic doctorates have increased in education, the participation rate of all minorities in education as a percent of all doctorates awarded has declined between 1975 and 1986 by 43 percent.

In interpreting these results, it is important to point out that the small size of the minority doctorate pool is in direct contrast to the present oversupply of new Ph.D.s available for academic positions (Syverson and Forster, 1984), and will become even smaller as the projected academic pool expands.

The small size of the pool is a contributing factor to the increasingly short supply of minority faculty. Nonetheless, in addition to the pipeline explanation of minority faculty underrepresentation, market factors may be a major impediment to the flow of minorities into academe, particularly among new doctorates. The analysis in this chapter makes use of time-series data to investigate a set of market factors to answer the following questions:

- Among minorities, which Ph.D.s are choosing the academic employment sector?
- What are the career options for new Ph.D.s and to what extent have these changed over time?

A third market factor — the relative salaries of academic vs. nonacademic employment for Ph.D.s — is examined in Chapter V, which examines the experiences of minorities in academe.

Postdoctoral Career Choices

Career Plans in Academe

In 1975, academe was the major employer of new Ph.D.s, but in 1986 this was no longer the case. For Black Ph.D.s, there were both absolute and proportional reductions in the number who were planning to enter academe between 1975 and 1986. For example, in 1986, less than half (272 out of 547 doctorates) of all Black Ph.D.s had plans for academic careers, compared to more than two-thirds (427 out of 633 doctorates) in 1975. Moreover, if one considers that this shortfall was based on almost 14 percent fewer Black doctorates, it is clear that the problem of increasing the Black faculty supply has become even more serious.

Table 4.1: Minorities as a Proportion of U.S. Ph.D.s and Within-Group with Committed Plans to Enter Academe by Race/Ethnic Status: U.S. Citizens, 1975-1986

Year	Race/Ethnic Status							
	Black		Hispanic		Asian-American		White	
	Ph.D.	Acad.	Ph.D.	Acad.	Ph.D.	Acad.	Ph.D.	Acad.
1975	3.8*	67.6**	1.2	70.7	1.1	50.7	93.7	60.3
1976	4.2	66.8	1.3	69.8	1.3	51.0	93.1	60.0
1977	4.5	66.4	1.7	70.2	1.4	54.2	92.2	58.2
1978	4.3	62.3	2.0	61.3	1.6	41.8	91.8	56.5
1979	4.4	59.0	1.9	68.5	1.8	40.8	91.5	54.3
1980	4.3	57.5	1.7	56.4	1.9	36.3	91.8	52.3
1981	4.2	53.7	1.9	63.4	1.9	42.4	91.6	50.7
1982	4.4	51.9	2.2	53.2	1.9	37.9	91.1	49.4
1983	3.9	46.7	2.3	53.4	2.1	43.9	91.4	50.1
1984	4.1	50.6	2.3	52.8	2.2	33.2	91.1	48.4
1985	4.0	49.6	2.5	56.7	2.3	39.9	90.9	48.0
1986	3.7	48.5	2.5	55.5	2.3	35.4	91.4	48.1

*Percent of total U.S. citizenship doctorate recipients reporting race/ethnic status.

**Percent of total doctorates within each race/ethnic group with committed plans to enter academe.

Source: National Research Council, Office of Scientific and Engineering Personnel, Survey of Earned Doctorates: 1975-1986.

Table 4.1 shows that the shift away from academe is similar among other minority groups, but unlike Black doctorates, the proportional decreases in the Asian-American and Hispanic commitments to academe were based on increasing pools. For example, even though the proportion of Hispanic Ph.D.s entering academic employment dropped 15.2 percent, there were 176 compared to 140 Hispanics with confirmed plans in academe in 1986 and 1975, respectively. By actual count, the number of Hispanic Ph.D.s increased by 27.1 percent in that time period. Hispanics also had the highest percentage of Ph.D.s who had confirmed plans to enter academe in 1986.

Asian-American Ph.D.s, whose proportion entering academe dropped by 15.3 percent between 1975 and 1986, were least likely to choose academic careers. Moreover, their actual numbers declined slightly from 76 new Asian-American Ph.D.s with employment plans in academe in 1975 to 75 in 1986.

While the overall decline in definite academic employment commitments for new Ph.D.s dropped 12 percent between 1975 and 1986, the general decline is more obvious in some specialties than in others (Table 4.2). For instance, education has been a traditional career choice for Blacks and, to some extent, for Hispanics; but the numbers of Black and Hispanic Ph.D.s in education who are currently going into academe declined sharply over the decade. The reduction was most substantial among Black doctorates, whose numbers dropped from 225 to 105 between 1975 and 1986. As noted previously, this reduction is significant because education accounts for the highest proportions of all Black doctorates entering academe.

Engineering was the only field showing an increase in minorities entering academe. However, the numbers on which these percentages are based are extremely small. For example, although engineering is one of the most active growth fields in the academic job market (Syverson and Forster, 1984), in 1975, there were only 7 members of minority groups — 1 Asian-American, 3 Black, and 3 Hispanic — out of 320 doctorates who had confirmed plans in engineering departments. In 1986, Asian Americans and Hispanics increased their numbers to 9 and 10 doctorates, respectively, while the number of Blacks with confirmed plans in engineering increased to 4.

Compared to the general downturn, the flow of minorities planning academic careers in the humanities has remained fairly stable.

Non-Academic Career Plans

Little is known about the factors underlying the general shift from academic to non-academic employment for new Ph.D.s. Two employment sectors have been major competitors with academe for new Ph.D.s — government and industry (Table 4.2). Field-specific employment commitments were examined to determine the extent to which these other employment sectors are capitalizing on the current supply of available minority Ph.D.s.

The trends reveal that business, industry, and "other" — e.g., elementary/secondary schools, nonprofit organizations, etc. — fields are employing larger numbers of minority Ph.D.s. This trend is most obvious in the physical sciences, the social sciences, and education. For example, in 1985, almost two-

Table 4.2: Percentage of Minority Ph.D.s in Selected Fields with Postgraduate Employment Commitments in Academe vs. Non-academe Sectors: U.S. Citizens*, 1975 and 1986

Field/ Race	Sector: Academe		Government		Bus./Ind.		Other	
Physical Science	75	86	75	86	75	86	75	86
Black	46.2	26.7	11.5	13.3	34.6	53.3	7.7	6.7
Hispanic	43.8	40.0	18.8	16.0	31.2	44.0	5.6	-0-
Asian-American	50.0	21.4	11.1	9.5	33.3	69.0	5.7	-0-
Engineering								
Black†	33.3	37.6	55.6	25.2	11.1	37.2	-0-	-0-
Hispanic	25.0	38.9	8.3	16.7	66.7	44.4	-0-	-0-
Asian-American	2.9	5.1	25.1	10.3	69.1	74.3	2.9	10.3
Life Science								
Black	75.0	52.2	25.0	8.7	-0-	21.7	-0-	17.4
Hispanic	76.5	77.8	5.9	16.7	11.2	5.5	5.4	-0-
Asian-American	50.0	26.7	28.6	20.0	7.1	50.0	14.3	3.3
Social Science								
Black	79.4	56.4	11.2	11.9	-0-	6.9	9.3	24.8
Hispanic	82.1	49.3	5.1	20.0	12.8	10.7	-0-	20.0
Asian-American	71.4	48.4	23.8	12.9	-0-	22.6	4.8	16.1
Humanities								
Black	93.5	85.0	1.6	2.5	-0-	-0-	4.7	12.5
Hispanic	94.7	91.3	2.6	4.3	-0-	-0-	2.5	4.2
Asian-American	84.2	82.4	-0-	5.9	5.3	-0-	10.5	11.7
Education								
Black	60.0	38.3	12.5	18.2	1.6	3.3	25.9	40.0
Hispanic	62.9	45.7	11.4	14.7	1.4	6.0	24.3	33.6
Asian-American	58.6	35.3	13.8	14.7	-0-	5.9	27.6	44.1
Profess./Other								
Black	88.5	66.0	3.8	66.0	-0-	6.0	7.7	12.0
Hispanic	83.3	68.4	-0-	68.4	-0-	15.8	16.7	15.8
Asian-American	84.6	78.9	-0-	78.9	15.4	5.3	-0-	10.5

* Includes native-born and naturalized citizens.

† Percentages for Black Ph.D.s are based on N of 9 individuals in 1975 and 8 individuals in 1986.

Source: National Research Council, Office of Scientific and Engineering Personnel, Survey of Earned Doctorates, 1975 and 1986.

thirds of new Asian-American Ph.D.s in the physical sciences planned to take offers from business and industry, reflecting, in part, the increasing difficulty in finding academic employment in this field (Porter and Czujko, 1986). Among social scientists, there was a substantial shift toward job opportunities in business and industry, although proportionally more minorities in the social sciences and education sought positions in the "other" employment sector, particularly among Blacks and Hispanics.

Postdoctoral Training Appointments

Postdoctoral training has traditionally helped new Ph.D.s become competitive for top faculty positions (Zumeta, 1984). Although only minor changes have occurred in the relative proportions of Ph.D.s taking postdoctoral appointments, there has been a positive shift toward additional training among minorities (Table 4.3).

Table 4.3: Percent Minority S/E and Humanities Ph.D.s with Committed Plans for Postdoctoral Study: U.S. Educated, 1975-1986

Year	Black	Hispanic	Asian-American	Total U.S. Pop.
1975	5.6	12.4	33.6	15.4
1976	5.0	9.5	38.7	16.7
1977	6.5	12.0	30.7	17.3
1978	6.0	10.0	31.0	18.8
1979	5.8	13.4	34.9	19.2
1980	5.7	11.4	37.8	18.8
1981	6.0	14.6	39.7	19.3
1982	5.2	14.0	39.4	19.6
1983	7.0	13.5	35.0	20.5
1984	6.9	14.0	40.2	21.3
1985	8.8	15.2	36.0	21.2
1986	10.9	19.2	47.5	22.1

Source: National Research Council, Office of Scientific and Engineering Personnel, Survey of Earned Doctorates, 1975-86.

Asian Americans continue their tradition of high participation in postdoctoral study, and their participation rates far exceeded the rates for other minority groups, as well as the national rate. Hispanics ranked second and their rates were about twice that of Black postdoctorates, who continued to make a poor showing in this pool; less than 10 percent of all Black Ph.D.s had plans for postdoctoral study in 1986.

Minority Labor Force Participation

Using data on career outcomes from the SDR, this section examines the employment status, field mobility, and the labor force participation of minority doctorates. The reader is reminded, however, that the SDR sample excludes doctorates in education and the professions; the SDR follows the career progress of doctorates from U.S. universities who graduated between 1944 and 1985 in the sciences, engineering, and the humanities, and, in this sample, who received their high school education in the United States (hereafter referred to as U.S. educated).

Employment Status

Nearly all minority Ph.D.s surveyed in 1985 were in the labor force (Table 4.4). Except for Asian Americans, who were more likely to accept postdoctoral appointments, more than 85 percent of minority Ph.D.s were in full-time employment. Ph.D.s who were not fully employed or who did not take postdoctoral appointments were about equally divided between part-time employees and those who were not employed; Hispanics had slightly larger percentages in both groups.

Part-timers were asked, "What was the most important reason for being in part-time status?" The difference between Asian-American and non-Asian-American responses was largely related to differences in reported labor-force conditions (Table 4.5). Asian Americans were over two-and-a-half to three times more likely than Hispanics or Blacks to prefer part-time employment. In contrast, the latter two groups more frequently said that they took part-time jobs because they were unable to find full-time employment. Fewer minorities reported that part-time employment was caused by family constraints (including marital reasons) or "other" reasons, although Blacks noticeably

differed from Hispanics and Asian Americans who gave these reasons (less likely to cite family constraints and more likely to cite "other" reasons).

Table 4.4: Employment Status of Minority S/E and Humanities Ph.D.s (1944-1985): U.S. Educated, 1985 (in percent †)

	Race/Ethnic Group			
	Black (5,487)	Hispanic (5,144)	Asian-American (4,082)	U.S. Total (367,767)
Employment Status:				
Employed	93.9	92.0	89.0	93.0
Full time	90.1	87.0	84.8	90.1
Part time	3.8	5.0	4.5	3.8
Postdoctoral	2.6	3.4	7.4	2.6
Not employed*	3.4	4.5	3.3	3.4
Seeking	1.0	1.7	1.3	1.0
Not Seeking	.8	1.0	.7	.8
Retired	1.2	1.1	.5	1.2

* Percentages are not unemployment rates because they are calculated on the total population, which includes retired, not seeking employment, and those not reporting status, none of whom are defined as part of the labor force.

† Note: Percentages may not add up to 100 because students, other, and no-report cases are excluded.

Source: National Research Council, Survey of Doctorate Recipients, 1985.

Table 4.5: Most Important Reason for Part-Time Employment Status, by Race/Ethnic Group: U.S. Educated, 1985 (in percent †)

Most Important Reason:	Black (161)	Hispanic (256)	Asian-American (183)	U.S. Total (14,015)
Preferred Part time	14.3	19.1	50.8	26.7
Full time Unavailable	48.4	27.3	15.7	26.5
Family Constraints	4.3	11.3	11.4	12.5
Other	14.9	8.2	8.1	8.1

† Note: Percentages may not add up to 100 because no-report cases are excluded. Includes only S/E and Humanities Ph.D.s.

Source: National Research Council, Survey of Doctorate Recipients, 1985.

Type of Employer

Although academic career plans have declined, the major employer of minority Ph.D.s who graduated between 1944 and 1985 has been four-year educational institutions (Table 4.6). Black Ph.D.s, whose proportions were about 10 to 21 points higher than other groups, had the highest proportions employed in academe; about 71 percent of all Black Ph.D.s were in academic institutions. Minority doctorates were also attracted to business and industry, particularly among Hispanics and Asian Americans, who had large percentages of Ph.D.s graduating from computer science, chemistry, and engineering fields. Business and industry are the principal employers of computer scientists, chemists, and engineers, and the second largest employers of Ph.D.s in all other fields (NRC, 1985). Collectively, federal, state, and local government agencies made up the third largest source of employment for minority Ph.D.s surveyed in 1985.

Table 4.6: Employers of Minority S/E and Humanities Doctorates* (1944-1985 Graduates): U.S. Educated, 1985 (in percent †)

Type of Employer	Black (5,327)	Hispanic (4,910)	Asian-American (3,948)	U.S. Total (355,136)
Bus./Ind.	12.8	21.0	35.5	26.5
Academe:	70.8	63.1	50.1	58.2
4-Yr.	66.7	56.9	46.1	54.5
2-Yr.	2.1	4.5	3.6	2.2
Elem./Sec.	2.0	1.7	.4	1.4
Hosp./Clinic	3.1	2.9	3.0	2.7
Non-Prof. Org.	3.6	3.4	2.9	3.6
Fed. Govt.	5.9	5.8	6.6	6.1
Mil./Comm. Corps	.7	.5	.5	.5
State Govt.	1.9	2.3	.7	1.5
Other Govt.	1.2	.8	.5	.6

† Note: Percentages do not add up to 100 because no-report and other cases are excluded.

* Includes full- and part-time and postdoctoral appointments.

Source: National Research Council, Survey of Doctorate Recipients, 1985.

Field Mobility

Science/Engineering. Labor-market shifts are best illustrated by tracking the field mobility of minority Ph.D.s. Doctorates employed in non-Ph.D. fields are said to be "field mobile" (NRC, 1986a), and, in 1985, the transfer from one field to another differed by race/ethnic group and Ph.D. specialty. Table 4.7 presents the results for science and engineering Ph.D.s. Except for the computer sciences, the fields with the highest and lowest retention rates varied by race/ethnic group. Among Black Ph.D.s, those in mathematics (84.3 percent), engineering (85.1 percent), and computer sciences (80 percent) had higher retention rates than those in other S/E specialties, although their numbers were sparse in the computer sciences (N=10). The lowest Black retention rates were in the biological (67.7 percent), medical (66.4 percent), and social sciences (69 percent).

Hispanic S/E doctorates in the computer sciences (100 percent) and chemistry (92 percent) had the highest rate of retention, although, the number (N=7) employed in the computer sciences was fairly sparse. Hispanics were more mobile in the agricultural and medical sciences; slightly less than two-thirds of Hispanics in these fields remained in their doctoral field specialty.

Among Asian Americans, Ph.D.s in mathematics (51.1 percent) had the largest outflow; more than one-fourth of Asian-American mathematicians took jobs in the biological sciences. Computer scientists (86.4 percent) were the most likely Asian-American group to stay in their doctoral specialty.

Minorities in the social sciences had the highest field mobility and, more than any other group, took jobs in non-Ph.D. fields.

Interesting differences appeared between minority groups in their patterns of transfer. For example, among Ph.D.s flowing out of mathematics, Blacks (N=12) and Hispanics (N=37) switched to the computer- and information-science fields, while Asian

Table 4.7: Field Mobility of Employed Black Doctoral Scientists and Engineers (1944-1985 Graduates): U.S. Educated, 1985 (in percent)

1985 Field of Employment	All Fields	Field of Doctorate: Math	Comp. Sci.	Phys./ Astrn.	Chem.	Earth/ Envir. Sci.	Engin- eering	Agric. Sci.	Med. Sci.	Bio. Sci.	Psych.	Social Sci..
Total No. Employed (N)	4,052	166	10	97	337	19	174	106	274	589	1,034	1,246
Mathematics	3.6	**84.3**		2.1							.5	
Comp./Information Sci.	1.4	7.2	**80.0**	2.1		10.5	11.5				.4	.6
Physics/Astronomy	2.3			**73.2**	2.1	10.5	1.7	2.8	.7	.7		
Chemistry	6.9				**73.0**					5.6		
Earth/Envir. Sciences	1.7			4.1	11.0	**78.9**				1.9		
Engineering	5.3	2.4	10.0	8.2	4.5		**85.1**				.9	2.2
Agricultural Sciences	2.5				.9			**70.8**		2.7		.6
Medical Sciences	8.8			2.1	3.9				**66.4**	10.9	4.2	4.2
Biological Sciences	11.2				1.5			5.7	13.9	**67.7**	.2	.2
Psychology	18.7								2.2		**71.6**	.9
Social Sciences	22.6							4.7	3.6		3.8	**69.0**
Nonscience/ Nonengineering	12.5	6.0	10.0	4.1	2.7		1.7	14.2	9.9	6.3	16.6	18.4
No Report	2.5			4.1	.6			1.9	3.3	3.1	1.5	3.9

Source: National Research Council, Survey of Doctorate Recipients, 1985.

Table 4.7 (Continued): Field Mobility of Employed Hispanic Doctoral Scientists and Engineers (1944-1985 Graduates): U.S. Educated, 1985 (in percent)

1985 Field of Employment	All Fields	Field of Doctorate: Math	Comp. Sci.	Phys./ Astrn.	Chem.	Earth/ Envir. Sci.	Engin- eering	Agric. Sci.	Med. Sci.	Bio. Sci.	Psych.	Social Sci.
Total No. Employed (N)	3,577	183	-0-†	186	432	88	382	105	145	570	820	659
Mathematics	3.5	**67.2**		1.6								
Comp./Information Sci.	3.4	20.2		2.7	.7		3.1			.9	4.0	3.0
Physics/Astronomy	4.2			**68.8**	.5		5.8					
Chemistry	11.8			1.6	**92.1**	1.1	.5		2.1	2.8		
Earth/Envir. Sciences	2.8	.5		1.1	.7	**68.2**	2.4	6.7		.7		2.0
Engineering	11.2	8.7		21.5	.9	8.0	**85.6**			.4	.4	
Agricultural Sciences	2.2				.5	2.3		**64.8**		1.4		
Medical Sciences	6.0	1.6			.5	1.1	.3		**63.4**	13.9	3.5	1.4
Biological Sciences	14.4	1.6			.9	2.3		17.1	22.8	**78.2**	1.0	
Psychology	18.6				.5						**80.5**	.5
Social Sciences	13.2							1.0		.4	.4	**70.6**
Nonscience/ Nonengineering	7.7			2.7	2.3	14.8	2.4	10.5	8.3	.4	9.4	20.9
No Report	.7				.5					1.1	.9	1.7

† N less than 10.

Americans (N=25) went into the biological sciences. However, there were similarities in transfer patterns. Most minority Ph.D.s switching from physics/astronomy fields went into engineering, and most medical scientists who switched fields transferred into the biological science fields.

Humanities. The situation for the humanities is somewhat different in that there was more mobility between fields. Mobility between fields with similar content made the transfer from one field to another relatively easy (Table 4.8). Music had fairly high retention rates for all groups. All of the Black Ph.D.s (N=18) in art history and nearly all of the Black doctorates (N=289) in English/American language and literature remained in their field specialties.

Similarly, all Hispanics (N=14) in speech and theater stayed in their specialty. Relatively few Asian Americans were employed in the humanities and, other than the field of music, Asian-American retention rates were generally lower than the rates for Blacks and Hispanics in all the humanities fields.

Fields in the "other" humanities (e.g., linguistics, archaeology, American studies, religious studies, and other unidentified humanities) had the lowest retention rate of all the humanities fields: Asian Americans (N=17) and Blacks (N=55) with doctorates in the "other" humanities and who were employed in nonhumanities fields were generally employed in such fields as education and the social sciences (NRC, 1985). Hispanics (N=24) with "other" humanities doctorates were more likely to be employed in modern languages and literature.

Table 4.7 (Continued): Field Mobility of Employed Asian-American Doctoral Scientists and Engineers (1944-1985 Graduates): U.S. Educated, 1985 (in percent)

1985 Field of Employment	All Fields	Field of Doctorate: Math	Comp. Sci.	Phys./ Astrn.	Chem.	Earth/ Envir. Sci.	Engin- eering	Agric. Sci.	Med. Sci.	Bio. Sci.	Psych.	Social Sci.
Total No. Employed (N)	3,681	94	44	294	417	77	713	85	148	851	513	445
Mathematics	1.6	**51.1**					1.3			.2		
Comp./Information Sci.	2.8	10.6	**86.4**	1.0	1.7		2.0			1.3		4.7
Physics/Astronomy	7.9	1.1		**63.3**	1.9		13.2		2.0			
Chemistry	8.0			1.4	**55.4**	3.9	4.9		2.0	2.1		
Earth/Envir. Sciences	2.2			1.0	.5	**83.1**	.3	3.5	1.4	.5		.4
Engineering	16.1	5.3	13.6	20.4	3.8	5.2	**66.8**		1.4	2.2	.6	
Agricultural Sciences	1.9				.7			**52.9**	1.4	2.4		
Medical Sciences	6.4			.7	10.3			2.4	**60.1**	7.4	5.5	1.8
Biological Sciences	24.5	26.6		9.2	13.2	1.3	.4	22.4	31.1	**79.7**	7.8	1.6
Psychology	10.7										**76.4**	.7
Social Sciences	9.8	3.2						2.4			2.7	**76.6**
Nonscience/ Nonengineering	6.1			1.7	11.8	6.5	6.3		.7	3.1	6.6	13.5
No Report	1.8	2.1		1.4	.7	3.9	16.5			1.1	.4	.7

Source: National Research Council, Survey of Doctorate Recipients, 1985.

Table 4.8: Field Mobility of Employed Black Humanities Doctorates (1944-1985 Graduates): U.S. Educated, 1985 (in percent)

1985 Field of Employment	All Fields	Field of Doctorate: Amer. Hist.	Other Hist.	Art Hist.	Music	Speech/ Theater	Philos.	Eng./Amer. Lang. & Lit.	Classical Lang. & Lit.	Modern Lang. & Lit.	Other Human- ities
All Fields (N)	1,263	189	175	18	187	49	19	326	10	136	154
American History	13.3	**69.8**	17.1								3.9
Other History	10.6	14.3	**57.7**		1.6		10.5				.6
Art History	1.6			**100.0**							1.3
Music	13.5				**90.4**						1.3
Speech/Theater	2.5					**65.3**					
Philosophy	1.0						**68.4**				
English/American Lang. & Lit.	28.3					4.1		**88.7**		3.7	39.6
Classical Lang. & Lit.	.2								**20.2**		
Modern Lang. & Lit.	9.2							.6		**83.8**	
Other Humanities	3.3					8.2		.9	80.0	2.9	**14.9**
Non-Humanities	15.7	15.9	25.1		8.0	22.4	21.1	8.6		8.1	35.7
No Report for Field of Emp.	.8							1.2		1.5	2.6

Source: National Research Council, Survey of Doctorate Recipients, 1985.

Table 4.8 (Continued): Field Mobility of Employed Hispanic Humanities Doctorates (1944-1985 Graduates): U.S. Educated, 1985 (in percent)

1985 Field of Employment	All Fields	Field of Doctorate: Amer. Hist.	Other Hist.	Art Hist.	Music	Speech/ Theater	Philos.	Eng./Amer. Lang. & Lit.	Classical Lang. & Lit.	Modern Lang. & Lit.	Other Humanities
All Fields (N)	1,345	27	153	24	45	14	32	241	11	744	54
American History	2.1	**59.3**	7.8								
Other History	6.8	7.4	**58.2**								
Art History	1.1			**62.5**							
Music	3.0				**88.9**						
Speech/Theater	1.5				4.4	**100.0**		1.7			
Philosophy	1.9						**71.9**			.3	
English/American Lang. & Lit.	14.3							**64.3**		5.0	
Classical Lang. & Lit.	.4								**54.5**		
Modern Lang. & Lit.	40.2									**69.5**	44.4
Other Humanities	7.4							10.0		8.1	**29.6**
NonHumanities	18.3	33.3	34.0	37.5	6.7		28.1	23.2	45.5	12.5	18.5
No Report for Field of Emp.	3.0							.8		4.7	7.4

Source: National Research Council, Survey of Doctorate Recipients, 1985.

Table 4.8 (Continued): Field Mobility of Employed Asian-American Humanities Doctorates (1944-1985 Graduates): U.S. Educated, 1985 (in percent)

1985 Field of Employment	All Fields	Field of Doctorate: Amer. Hist.	Other Hist.	Art Hist.	Music	Speech/ Theater	Philos.	Eng./Amer. Lang. & Lit.	Classical Lang. & Lit.	Modern Lang. & Lit.	Other Humanities
All Fields (N)	297	-0-	48	-0-	31	-0-†	15	55	-0-†	81	42
American History	1.7										
Other History	10.4		**64.6**								
Art History	1.3										
Music	8.4				**80.6**						
Speech/Theater	1.3										
Philosophy	3.7						**73.3**				
English/American Lang. & Lit.	13.5							**58.2**		7.4	4.8
Classical Lang. & Lit.	4.7									14.8	
Modern Lang. & Lit.	12.1									**42.0**	4.8
Other Humanities	17.5							20.0		24.7	**50.0**
Non-Humanities	22.9		25.0		19.4		26.7	21.8		11.1	40.5
No Report for Field of Emp.	2.4		10.4								

† N less than 10 cases.

Source: National Research Council, Survey of Doctorate Recipeints, 1985.

Compared to S/E doctorates, minorities in the humanities were frequently employed in fields other than their Ph.D. specialty.

Trends in Ph.D.s Working Outside Their Ph.D. Fields

Trend data reveal that the percentages of minorities working in non-Ph.D. fields have gradually increased over the years; but, by 1983, the proportions within groups appeared to be leveling off (Table 4.9). Asian Americans working outside their Ph.D. field specialty almost doubled between 1977 and 1985. Black and Hispanic Ph.D.s working outside their field also increased, both within their group and as a fraction of the total pool. Blacks, however, had the lowest percentage of Ph.D.s working outside of their field.

Table 4.9: Ph.D.s† Working in Non-Ph.D. Degree Fields as a Percentage of Full-Time Employed Doctorates, by Race/Ethnic Group: U.S. Citizens*, 1977, 1979, 1981, 1983, 1985

Survey Year	Black	Hispanic	Asian-American	Total U.S.
1977				
% of U.S. Ph.D.s	1.0	1.0	2.7	95.3
% Within-Group**	16.9	11.2	11.6	13.3
1979				
% of U.S. Ph.D.s	1.0	1.3	3.3	94.4
% Within-Group	19.9	16.1	20.0	20.0
1981				
% of U.S. Ph.D.s	1.2	1.6	4.6	92.6
% Within-Group	21.2	21.2	23.4	21.8
1983				
% of U.S. Ph.D.s	1.3	1.5	5.1	92.1
% Within-Group	21.2	21.2	23.4	21.9
1985				
% of U.S. Ph.D.s	1.4	1.6	5.4	91.6
% Within-Group	17.7	20.9	22.3	21.7

† Includes only Science, Engineering, and Humanities Ph.D.s.

* Includes U.S. naturalized citizens.

** Percentage of Ph.D.s working in non-Ph.D. fields within each race/ethnic group.

Source: National Research Council, Survey of Doctorate Recipients 1977, 1979, 1981, 1983, 1985.

The two most important reasons given by minorities for working outside of their doctoral specialty were, in rank order: (1) jobs in non-Ph.D. fields offered more attractive career options, and (2) jobs were unavailable in their specialty (Table 4.10). The third most frequently cited reason differentiated Asian Americans from non-Asian Americans. Black Ph.D.s were more likely to report that they were attracted to jobs outside of their specialty because of better salaries, while Hispanics were equally likely to cite better pay and promotion for working out of field. Asian Americans had no clear third-ranked reason but, rather, cited a variety of other reasons (15.2 percent) for being employed in another field.

Table 4.10: Most Important Reason for Employment in Non-Ph.D.† Field, by Race/Ethnic Status: U.S. Educated, 1985 (in percent)

Most Important Reason:	Black (953)	Hispanic (986)	Asian-American (1,054)	U.S. Total (78,092)
Better Pay	15.5	13.1	5.9	9.1
More Attractive Career	35.7	34.2	38.5	40.9
Position in Ph.D. Field Unavailable	24.9	23.2	20.7	17.6
Promoted to New Field	8.0	12.4	5.0	10.9
Geographic Location	2.3	5.1	3.6	3.6
Family Constraints	2.1	1.5	5.5	2.6
Personal Preference	2.2	.6	5.5	4.3
Other	9.3	9.9	15.3	11.0

† Includes only Ph.D.s in Science, Engineering, and the Humanities who reported reasons for employment.

Source: National Resource Council, Survey of Doctorate Recipients, 1985.

Summary

Nearly all minority Ph.D.s are employed and, although the majority were employed in full-time positions in four-year academic institutions, there were notable shifts away from academic to non-academic employment between 1975 and 1985. The shifts were most apparent in the physical sciences, the social sciences, and education.

The field mobility (or lack of retention) of minority Ph.D.s in S/E fields varied by race/ethnic group and discipline; however, minority S/E doctorates in fields such as computer sciences and engineering had higher retention rates than Ph.D.s in the social sciences. Overall, the field of music had one of the highest retention rates in the humanities, although Blacks in art history, English/American language and literature, and Hispanics in speech and theater also had high retention rates. Field mobility was highest in the "other" humanities field group.

Compared to 1975, minority Ph.D.s were more likely to be employed outside their non-Ph.D. fields in 1985, citing, as the two primary reasons that their job offered more attractive career options and the inability to find jobs in their Ph.D. field. Blacks and Hispanics were more likely than Asian Americans to report that they were attracted to non-Ph.D. specialties because of better salaries.

Thus far, minority underrepresentation in academe has been attributed to two factors. First, among Asian Americans and Hispanics, it is associated with the slowdown in doctoral production, and among Blacks, to their real and relative declines in the doctorate pool. Second, among new minority Ph.D.s, the proportions choosing careers in academe is dwindling. However, a third aspect of the outflow may be illuminated by a better understanding of how minorities actually fare in academe. For example:

- What is the current status and nature of minority faculty recruitment in academe (i.e., type of appointments, type of institutions)?
- What type of work experiences do minority faculty have in academe? and,
- Are minority Ph.D.s promoted and retained at the same rate as other doctorates, and if not, what is the nature and extent of the difference?

Faculty Appointments

The race/ethnic composition of full-time faculty Ph.D.s in U.S. colleges and universities is summarized in Table 5.1. Between 1975-1986, there was a gradual decline in the percentage of White faculty — from 95.5 percent to 92.6 percent — accompanied by an incremental increase in minority faculty appointments. Similar to the minority doctoral production rates between 1975 and 1985, the increase in the appointment of Ph.D.s to full-time faculty positions among Hispanics (1.0 percent) and Asian Americans (1.2 percent) were slightly larger than for Black full-time faculty, whose proportions increased less than one percent (0.7 percent).

Table 5.1: Percent Distribution of S/E and Humanities Doctorates (1944-1985) Employed as Full-Time Faculty in 2-Year and 4-Year Colleges and Universities by Race/Ethnic Status and Institutional Type: U.S. Citizens, 1975-1985.

Year	Black	Hispanic	Asian-American	White
		Total		
1975	1.2	.7	2.6	95.5
1985	1.9	1.7	3.8	92.6
		Four-Year Colleges/Universities		
1975	1.1	.7	2.6	95.4
1985	1.9	1.6	3.8	92.7
		Two-Year Colleges		
1975	2.1	1.2	2.3	94.4
1985	1.4	4.1	3.4	91.1

Source: National Research Council, Survey of Doctorate Recipients, 1985.

Patterns of increase in the appointment of Ph.D.s to full-time positions were similar in two-year institutions for Hispanics and Asian Americans, but not for Black (or White) Ph.D.s, whose proportions dropped in these institutions. Because Hispanic and Asian-American increases occurred on larger bases, their relative gains were both real and proportional in two-year colleges.

Full-time and Part-time Appointments

In 1985, 95 percent or more of minority doctorates were employed full-time in higher education and more than 90 percent were employed in four-year colleges and universities (Table 5.2). Part-time faculty varied by race/ethnic status as well as by type of institution. Asian Americans had the highest rate of part-time faculty appointments, while Blacks had the lowest rate.

Table 5.2: Employment Status of S/E and Humanities Minority Doctorates (1944-1985) in Faculty Positions by Type of Institution: U.S. Educated, 1985 (in percent)

Employment Status-Total and Type of Institution	Black (3,534)	Hispanic (2,901)	Asian-American (1,707)	U.S. Total (186,035)
Full time:	98	97	95	97
4-Yr. Institutions	97	92	92	96
2-Yr. Institutions	3	8	8	4
Part time:	2	3	5	3
4-Yr. Institutions	100	92	97	91
2-Yr. Institutions	–0–	-0-†	-0-†	9

† Cells with five cases or less.

Source: National Research Council, Survey of Doctorate Recipients, 1985.

Off-Ladder Appointments

Faculty positions that normally do not lead to tenure (i.e., lecturer/instructor) are referred to as off-ladder or non-faculty appointments. Minority Ph.D.s in non-faculty appointments were more likely to be in two-year institutions; corresponding to their increases in these institutions, more Asian-American Ph.D.s were appointed to off-ladder positions in two-year institutions (Table 5.3). The trends also show that, until recently, Black Ph.D.s were more likely to hold non-faculty positions in four-year institutions; since 1983, however, relatively more Hispanic Ph.D.s have accepted off-ladder appointments.

Field of Appointment

Faculty appointments in the social sciences and humanities correspond to the higher proportion of Ph.D.s who earned doctoral degrees in these fields. Except for Asian Americans, who were about equally represented in the life and social science departments in four-year institutions, most minority faculty were employed in social science and humanities departments (Table 5.4). In four-year institutions, compared to the national rate, Blacks were overrepresented in the social sciences and education; Hispanics were overrepresented in the Humanities. In both two- and four-year institutions, Black faculty were underrepresented in the physical and life science departments. Hispanics in two-year institutions were overrepresented in the

physical sciences and underrepresented in social science departments. There were virtually no Black doctorates appointed to full-time positions in engineering departments in four-year institutions and almost no appointments were made or expected in engineering departments in two-year colleges. In general, the appointment patterns for two- and four-year institutions were similar except for Hispanics in the physical sciences and Asian Americans, who were underrepresented in life-science departments in two-year colleges.

Table 5.3: Percent Full-Time S/E and Humanities Minority Faculty at Rank of Instructor/Lecturer, by Type of Institution: U.S. Citizens*, 1975, 1977, 1979, 1981, 1983, 1985

Year	Black	Hispanic	Asian-American	U.S. Total
	Four-Year Institutions			
1975	.6	.3	.2	.9
1977	1.3	.9	1.4	1.4
1979	.8	.7	.3	.5
1981	3.9	3.0	1.1	3.8
1983	2.0	2.6	2.6	2.1
1985	1.3	2.9	1.8	2.3
	Two-Year Institutions			
1975	9.4	13.8	23.2	19.1
1977	12.2	41.8	42.6	25.3
1979	3.8	14.2	46.1	21.4
1981	9.0	32.6	44.8	26.8
1983	18.3	20.5	47.0	24.3
1985	10.7	29.4	55.4	26.7

*Includes native-born and naturalized citizens.

Table 5.4: Field of Academic Employment of Full-Time S/E and Humanities Minority Faculty in 2-Year and 4-Year Institutions of Higher Education: U.S. Educated, 1985 (in percent*)

Field of Employment	Four-Year Institutions			
Total N	Black (3,355)	Hispanic (2,589)	Asian-American (1,490)	U.S. Total (180,077)
Phys. Sci.	9.6	4.4	18.7	18.7
Life Sci.	16.7	16.4	31.8	22.4
Engineering	1.6	6.0	5.6	7.4
Soc. Science	40.4	21.7	31.5	26.0
Humanities	30.1	37.4	12.3	24.9
	Two-Year Institutions			
Total N	Black (113)	Hispanic (216)	Asian-American (138)	U.S. Total (7,366)
Phys. Sci.	4.4	25.0	16.7	14.3
Life Sci.	13.3	9.7	1.4	16.4
Engineering	-0-	1.4	-0-	.6
Soc. Science	48.7	15.7	61.6	24.3
Humanities	33.6	48.1	20.3	42.3

*Percentages do not add up to 100 because other and no-report cases are excluded.

Source: National Resource Council, Survey of Doctorate Recipients, 1985.

Although information about the quality and type of institution (i.e., public vs. private) is not presented, a separate study of Black Ph.D.s has found that most who are employed in predominantly White institutions are concentrated in unranked departments in public institutions (Pearson, 1985).

Faculty Appointments in Traditionally Black Institutions

Before the 1954 U.S. Supreme Court decision in *Brown* vs. *Board of Education*, nearly all Black faculty worked in traditionally Black institutions (TBIs). Since that time, however, there has been a noticeable decline in the proportion of Black faculty employed in TBIs. Although 64 percent of all full-time faculty now working in TBIs are Black, previous studies show that the majority of Black Ph.D.s are employed in predominantly White institutions (Hill, 1983; Pearson, 1985).

Examination of the SDR data reveal that, in 1985, only one-third of all Black S/E and humanities doctorates in academe were employed in TBIs; the remaining two-thirds were employed in predominantly White institutions (Figure 1).

FIGURE 1

Percent S/E and Humanities Black Ph.D.s in Academe by Type of Institution: U.S. Educated, 1985

Source: National Resource Council, Survey of Doctorate Recipients, 1985.

Minority Work Experiences in Academe

The focus of this section shifts to the work experiences of minority faculty in order to answer three centrally important questions:

- What is the relative difference in the earning power of minority Ph.D.s in academe vs. other sectors?
- What is the primary work — teaching, research, or administration — of minority faculty?
- How do minority doctorates fare in the institution's reward structure as measured by their academic rank, promotion, and tenure rates?

Faculty Salaries

Academic salaries generally rank far below salaries in business and private industry and compare even less favorably when differences in training investments made by faculty (Ph.D. degree) and workers in occupations such as engineering (BA degree) are considered (Hansen, 1986).

The differences in academic and non-academic salaries of minorities were no exception when the salaries of Ph.D.s were adjusted to comparable 12-month equivalents in Table 5.5-A. The median annual salary for all full-time employed doctorates in S/E and humanities fields was $41,028 in 1985. The median salaries of all minority groups ranged from less than one (Asian American) to eight (Black) percent lower than the national average. Salary differences were more striking within race/

ethnic groups by employment sector and suggest that higher education is not matching the offers made to minority Ph.D.s by private industry and other sectors. For example, the median salary of Black Ph.D.s in academe was $6,982 lower (16 percent) than for Black Ph.D.s in non-academic employment, and the gap widened as years since the doctorate increased.

Table 5.5-A: Median Annual Salaries of Minority S/E and Humanities Ph.D.s Employed Full-Time†, by Years Since Ph.D. and Type of Postgraduate Employment Sector: U.S. Educated, 1985

1985 Adjusted†† Salary and Years Since Ph.D.	Black	Hispanic	Asian-American	U.S. Total
All Years:				
Academe*	$35,968	$34,911	$35,765	$37,376
Nonacademe	42,950	45,738	43,318	47,401
Total	37,844	38,250	40,773	41,028
% diff.**	16	24	17	21
5 Years or less:				
Academe	29,757	26,450	28,317	28,313
Nonacademe	36,863	39,256	39,279	37,479
% diff.	19	33	28	25
6 to 10 Years:				
Academe	34,203	33,843	33,692	32,977
Nonacademe	42,861	49,650	47,783	43,682
% diff.	20	33	29	25
11 to 15 Years:				
Academe	40,266	39,648	32,762	38,101
Nonacademe	54,586	49,200	42,659	50,723
% diff.	26	19	23	25
16 to 20 Years:				
Academe	45,231	45,011	52,450	42,973
Nonacademe	-0-***	-0-***	72,024	55,832
% diff.	-0-***	-0-***	27	23

† Full-time employment in academic institutions include only 2- and 4-year colleges and universities. Medical schools are excluded.

†† Nine-month academic salaries adjusted to 12-month equivalents.

* Excludes medical schools.

** The difference between nonacademic and academic median salaries, expressed as a percentage of the nonacademic median salary.

*** Median salaries are not reported for cells with fewer than 10 sample individuals.

Source: National Resource Council, Survey of Doctorate Recipients, 1985.

The disparity was even greater among Hispanics; Hispanics employed outside of academe on average earned $10,827 more (24 percent) than their cohorts in academe. Unlike Blacks, however, the disparity among Hispanics generally decreased among those who held the doctorate 11 or more years, although the nonacademic advantage was still substantial.

The Asian-American pattern revealed wide differences between academic and non-academic salaries that ranged from $10,962 (or 28 percent) 5 years or less after earning the doctorate to $19,574 (27 percent) after 16 to 20 years.

Quite apart from mere differences by sector, there were marked differences between race/ethnic groups within sectors (where comparisons could be made). Among Ph.D.s employed in academe, Black Ph.D.s earned higher median salaries than Hispanic or Asian American, regardless of years since the doctorate, except for Asian Americans, whose salaries were higher than Blacks among Ph.D.s who had held the doctorate for 16 years. One seemingly contradictory finding appears in Table 5.5-A: Black doctorates — who have a higher median salary than the U.S. average in all sub-year categories — have a lower median salary than the U.S. average for the total of all years since the Ph.D. This finding can be explained by the difference in the distributions of White (who make up 96 percent of the U.S. total) and Black doctorates. Fewer Black doctorates have held the Ph.D. for 16 or more years and, therefore, are less likely to be in the higher income categories. Moreover, this analysis does not control for field specialty: Black S/E doctorates are more likely to hold degrees in the behavioral sciences where median salaries are lowest for all Ph.D.s (Maxfield, 1981).

The level of academic salaries relative to minority Ph.D.s in comparable academic and non-academic field specialties is shown in Table 5.5-B. Based on these findings, among engineers in academe, the median adjusted salaries of Asian Americans and all U.S. faculty (who are primarily White) were considerably higher than the salaries of Blacks, but the earnings of Black engineers still surpassed the earnings of Hispanics by more than $3,000. Among non-academically employed doctorates, the annual median salaries for Black Ph.D.s were lower than the median salaries for other minorities, except among Ph.D.s who had held the doctorate for 11 to 15 years (Table 5.5-A). This finding persisted even when salaries were considered by field specialty (Table 5.5-B); Black earnings were consistently lower than the earnings of other groups, except in one field: among humanists, Black Ph.D.s earned slightly higher salaries than the median salaries of all Ph.D.s employed in non-academic positions. No Blacks or Hispanics employed in non-academic fields reported salaries among Ph.D.s who held the doctorate for 16 or more years. Their absence is understandable, because Black, and possibly Hispanic, Ph.D.s were virtually excluded from high-level job opportunities in private industry before the late 1960s (Pearson, 1985).

Table 5.5-B: Median Annual Salaries of Minority S/E and Humanities Ph.D.s Employed Full-Time by Field of Doctorate and Type of Postgraduate Employment: U.S. Educated, 1985

	Black	Hispanic	Asian-American	U.S. Total
	Academe			
Field of Ph.D.	1985 Adjusted Salary			
Engineering	$44,867	$41,523	$55,339	$48,767
Sciences	36,337	36,166	36,181	37,742
Humanities	34,267	31,398	30,278	34,360
Total	35,825	34,911	35,765	37,295
	Non-Academe			
Engineering	54,177	56,768	46,421	56,687
Sciences	42,223	46,388	42,625	46,689
Humanities	38,117	33,158	-0-†	31,217
Total	42,950	45,738	43,318	47,431

† N too small for estimation.

Source: National Resource Council, Survey of Doctorate Recipients, 1985.

Primary Work Activity

The work of college and university faculty quite often involves four overlapping tasks: teaching, research, administration, and service. Respondents to the SDR were asked to give their best estimate of the amount of professional time spent in each activity and then to specify their primary work activity.

Their responses, as summarized in Table 5.6, show that Black doctorates more often indicated that teaching was their primary task, followed by administration and research. The latter two

activities were reversed for Hispanics, who, in rank order, more often reported teaching, research, and administration as their primary work activity. Asian Americans were the only group who more frequently specified research as their primary work activity and teaching as the second most frequently cited task. Few Asian Americans were engaged in administration.

Table 5.6: Primary Work Activity of Minority S/E and Humanities Ph.D.s Employed as Full-Time Faculty in 2-Year and 4-Year Institutions: U.S. Educated, 1985 (in percent*)

Type of Inst./ Primary Work	Black	Hispanic	Asian-American	U.S. Total
Four-Year Inst:	(3,355)	(2,589)	(1,490)	(180,077)
Teaching	60.9	54.3	39.9	58.6
Research	11.7	22.4	41.6	21.6
Administration	17.4	15.9	8.7	17.3
Two-Year Inst:				
Teaching	70.2	70.4	86.2	83.1
Research	-0-	-0-	-0-	1.4
Administration	21.2	29.6	5.8	11.4

*Within-group percentages do not add to 100 because no-report and other cases are excluded.

Source: National Research Council, Survey of Doctorate Recipients, 1985.

Field specialties also played an important role in race/ethnic differences in work activity (Table 5.7). In all fields, Black and Hispanic Ph.D.s were more likely to be engaged in teaching. Except for engineering, a good percentage were also involved in administration. The only departments where appreciable proportions of Black faculty were conducting research were in the physical and life sciences. Aside from the humanities, where teaching was the main task, research was the primary activity for Hispanics in S/E fields, particularly in life science departments.

Table 5.7: Primary Work Activity By Field of S/E and Humanities Ph.D.s Employed as Full-Time Faculty: U.S. Educated, 1985 (in percent*)

Primary Work Activity	Phys. Science	Life Science	Eng.	Soc Science	Humanit
Black					
Total N	(327)	(575)	(53)	(1,411)	(1,048)
Teaching	57.5	46.1	84.9	59.0	70.4
Research	16.8	19.7	9.4	8.5	9.4
Administration	17.6	24.2	5.7	18.6	12.2
Hispanic					
Total N	(528)	(445)	(158)	(596)	(1,071)
Teaching	44.3	27.0	57.6	49.3	75.7
Research	26.1	42.1	27.8	23.8	6.0
Administration	25.8	20.0	6.3	13.4	15.0
Asian-American					
Total N	(279)	(474)	(84)	(555)	(211)
Teaching	33.4	22.4	31.0	58.7	72.0
Research	46.0	63.7	56.0	21.3	6.2
Administration	17.2	6.5	10.7	5.4	7.6

*Percentages do not add up to 100 because no-report and other cases are excluded.

Source: National Research Council, Survey of Doctorate Recipients, 1985.

Asian Americans were more likely than other minorities to report that they were primarily engaged in research, except in the social sciences and the humanities, however, the proportion engaged in research was exceptionally high for Asian Americans in all fields. Few Asian Americans were involved in departmental administration in any degree specialty.

Later we shall see that differences in primary work activity appear to be related to differences in tenure rates, but first let us consider the percentage of doctorates in each minority group who occupy various faculty ranks in academe.

Academic Rank

Climbing the academic ladder usually requires making the transition through a three-tiered ranking system from assistant, to associate, and finally, to full professor (Bowen and Schuster, 1986). Since the 1970s, when the number of new entrants in academe leveled off, faculty at the two senior ranks have increased, while the lower ranks (including instructor/lecturer) have declined. This trend was evident among the SDR respondents, although, in the aggregate, minority Ph.D.s were somewhat more evenly distributed across ranks than were White Ph.D.s (Table 5.8).

From another perspective, Table 5.9 shows how ranking patterns varied for full-time faculty according to academic department*. Black faculty were clustered in the two upper ranks in all departments, although they had somewhat higher proportions in the two lower ranks in the life sciences, social sciences, and the humanities. The problem of parity is markedly clear in engineering, where there were no Black assistant professors, and in the physical sciences, where relatively few were at the assistant level; this position generally serves as a pipeline to tenured faculty status. The concentration of Black faculty in the senior ranks in these fields supports other findings that a major source for new hires in engineering and the physical sciences are experienced doctorates working outside of academe rather than new doctorates (Syverson and Forster, 1984). Moreover, given the decline in recent Black Ph.D.s and the related decline in initial hires as assistant professors, it is not surprising to find a larger proportion of Black professionals in the associate and full professor ranks.

Hispanics were concentrated in the two higher ranks in the physical and life science departments. In other departments, they were largely in the associate- and assistant-level ranks. A large percentage of Hispanic Ph.D.s were junior- or associate-level faculty in the social sciences, fields in which there were virtually no Hispanic full professors.

Asian-American academic rank distributions were remarkably irregular and, almost in every department, differed from the distributions of other minorities. Compared to Hispanics and Blacks, fewer Asian Americans were in the top two ranks (particularly the associate rank) in physical science departments, where, in general, the faculty is aging (Porter and Czujko, 1986). Most Asian Americans in the two higher ranks were in life science, social science, and engineering departments, where they were most concentrated at the full professor rank. Asian Americans were about evenly distributed across ranks in the humanities.

Minority Faculty Promotions

Few colleges and universities successfully attract and retain non-Asian-American minority faculty. Once there, however, are

*This analysis does not control for time after award of degree.

non-Asian-American minority faculty likely to be promoted at rates similar to other groups? Are minorities more likely to be stalled at the associate-level ranks rather than being promoted to full professor? These questions can be partially answered by using SDR longitudinal data to determine the promotion rates of minorities. The equity in rates of promotion to senior-level ranks can also be examined with these data. Minority faculty who were at the assistant and associate ranks in 1977 were followed for a 9-year period: respondents who reported their rank as assistant or associate professor in 1977, were surveyed again in 1981, and 1985.

Table 5.8: Percentage Distribution of Minority S/E and Humanities Faculty by Academic Rank: U.S. Educated, 1985

Rank	Black (3,056)	Hispanic (2,244)	Asian-American (1,181)	Total (150,280)
Full Prof.	34.8	26.0	37.1	42.0
Assoc. Prof.	33.3	39.8	28.7	32.4
Asst. Prof.	25.3	27.8	27.2	19.8
Instructor/Other	6.7	6.4	7.0	5.7

Source: National Research Council, Survey of Doctorate Recipients, 1985.

Table 5.9: Percent Distribution of Minority S/E and Humanities Faculty by Academic Rank and Broad Field †, 1985

Academic Rank	Phys. Science	Life Science	Engin.	Soc. Science	Humanit.
			Total		
	(19,971)	(21,605)	(10,214)	(30,263)	(27,628)
Full Prof.	48.5	39.1	52.9	38.3	38.3
Assoc. Prof.	28.9	31.1	26.3	34.1	36.9
Asst. Prof.	19.0	22.5	16.2	21.8	18.1
Inst./Other	3.7	7.2	4.7	5.8	6.8
			Black		
	(218)	(264)	(34)	(883)	(669)
Full Prof.	50.0	34.1	17.6	23.9	40.1
Assoc. Prof.	32.6	35.2	82.4	39.5	34.8
Asst. Prof.	14.2	25.0	-0-	30.7	25.1
Inst./Other	3.2	5.7	-0-	5.9	10.0
			Hispanic		
	(291)	(219)	(129)	(363)	(598)
Full Prof.	64.6	25.6	12.4	1.7	24.2
Assoc. Prof.	15.5	50.2	72.9	43.5	39.0
Asst. Prof.	14.1	12.8	14.7	45.7	32.1
Inst./Other	5.8	11.4	-0-	9.1	4.7
			Asian-American		
	(190)	(299)	(46)	(233)	(115)
Full Prof.	37.9	46.5	80.4	21.5	26.1
Assoc. Prof.	12.6	23.4	4.3	51.1	33.0
Asst. Prof.	33.2	27.8	10.9	21.9	33.0
Inst./Other.	16.4	9.6	4.3	5.6	7.8

† Percentages do not add up to 100 because other fields and no-reports are excluded.

Source: National Research Council, Survey of Doctorate Recipients, 1985.

Assistant Professor Promotions. The progression from assistant to the associate and full professor ranks is presented in Table 5.10. In 1981, the promotion disparities between Black and other minority groups were wider than the disparities between Blacks and the national average. Compared to Hispanics and Asian Americans, fewer Black faculty were promoted to associate or full professor and, for the two top ranks, the combined differences ranged from 12 to 20 percent. Asian Americans and Hispanics had promotion rates higher than the national average, substantially so among Asian Americans, who had the highest percentage of faculty promoted to full professors. In contrast, Black senior-level promotions were about 9 percent below the national average.

Table 5.10: Promotion Decisions of Full-Time Minority S/E and Humanities Faculty Who Were Assistant Professors in 1977 in 4-Year Colleges and Universities: U.S. Citizens*, 1981 and 1985

Academic Rank	Black (277)	Hispanic (479)	Asian-American (276)	U.S. Total (23,726)
			1981	
Full Professor	2.2	7.5	30.8	2.7
Assoc. Professor	59.6	66.8	50.7	62.7
Asst. Professor	35.7	25.3	17.8	32.3
Inst./Admin.	.7	-0-	1.1	1.2
Other†	1.8	.4	.7	1.1
			1985	
	(217)	(363)	(273)	(18,423)
Full Professor	15.2	30.9	56.4	25.9
Assoc. Professor	68.7	57.9	40.3	64.9
Asst. Professor	12.0	8.0	1.7	6.7
Inst./Admin.	4.1	2.7	1.4	1.6
Other†	-0-	.3	1.2	.9

† "Other" category includes adjunct faculty.

* Includes native-born and naturalized citizens.

Source: National Research Council, Survey of Doctorate Recipients, 1985.

By 1985, the promotion disparities increased dramatically as Blacks fell further behind Asian Americans (41.2 percent), Hispanics (15.7 percent) and the national average (10.7 percent). The former, in particular, were clustered at the associate level with substantially fewer promotions to full professor. They also had the largest proportion still at the assistant professor level after 9 years in rank, indicating that, in both the promotion rate and time lapse, Black promotions lagged behind all groups in first-rung promotions.

Associate Professor Promotions. Among minority Ph.D.s who were associate professors in 1977, the disparities by race/ethnic group between those who were promoted to full professor in 1981 and those who were not were minimal. Although Blacks still trailed other minorities in the percentage promoted to full professor (Table 5.11), the results do not support the notion that Black faculty have difficulty making the transition from associate to full professor. Instead, minority faculty who made this transition by 1981 did so in proportions that were higher than the national average. By 1985, however, Black (60.9 percent) promotions failed to keep pace with the national rate (64.2 percent) or with the substantial promotion rates of Asian Ameri-

cans (74.3 percent) and Hispanics (75.9 percent). Thus, these findings show that: (1) Black assistant professors were not promoted at the same rate or in the same time-span as comparable Hispanic, Asian American, or White assistant professors; (2) after five years, all three minority groups had slightly higher rates of promotion from associate to full professor than the national average; however (3) after nine years, Black promotions to all senior ranks trailed the promotion rates of other groups, providing some credence to the perception that promotions for Black Ph.D.s are more likely to be stalled at the associate professor rank than the promotions of other race/ethnic groups.

Table 5.11: Promotion Decisions of Full-Time Faculty † Who Were Associate Professors in 1977 in 4-Year Colleges and Universities: U.S. Citizens*, 1981 and 1985

Academic Rank	Black	Hispanic	Asian-American	Total
	1981			
	(300)	(540)	(884)	(35,092)
Full Professor	44.3	46.5	49.5	42.3
Assoc. Professor	54.7	52.9	49.3	55.8
Asst. Professor	-0-	-0-	-0-	.3
Inst./Admin.	.7	-0-	1.1	1.1
Other**	.3	.5	-0-	.5
	1985			
	(266)	(444)	(672)	(29,670)
Full Professor	60.9	75.9	74.3	64.2
Assoc. Professor	36.8	24.1	22.0	32.5
Asst. Professor	-0-	-0-	-0-	.3
Inst./Admin.	2.9	-0-	3.7	2.9
Other†	.2	-0-	-0-	.2

† Includes only S/E and Humanities Ph.D.s.

* Includes native born and naturalized citizens.

** "Other" category includes adjunct faculty.

Tenure Decisions

The promotion and tenure processes coincide in most colleges and universities and are central to the retention of faculty. The percentage of full-time tenured U.S. faculty in 1980 was 63 percent, and in 1985, was estimated to run well over 70 percent (Bowen and Schuster, 1986). We examined tenure outcomes of minority doctorates employed as full-time faculty in four-year colleges and universities.

In reviewing tenure status, it is important to consider those faculty who were nontenured, but were in "tenure-track" compared to those in "non-tenure-track" positions. Table 5.12 shows that, in 1985, the national rates for full-time faculty who were tenured, in tenure-track, and in non-tenure-track positions were 70.9, 19.2, and 7.8 percent, respectively. Compared to these rates minorities were: (1) less likely to be tenured (61.5 to 65.5 percent); (2) more likely to be in tenure-track positions (25.4 to 27.6 percent); and were (3) slightly more likely to be in non-tenure track positions (8 to 8.9 percent).

Although tenure and promotion decisions usually coincide, slightly more Blacks and, in particular, Hispanics were tenured at the assistant-level or below. At the senior-level ranks, fewer minority full professors and more associate professors were tenured relative to comparable national tenure rates.

Race/ethnic differences show that slightly more Blacks than Hispanics or Asian Americans were tenured among full professors, and the differences between the Black and the other two minority groups were greater than the difference between Blacks

Table 5.12: Percentage* Distribution of Minority Full-Time Faculty † in 4-Year Colleges and Universities by Tenure Status and Academic Rank: U.S. Educated: 1985

Tenure Status/ Academic Rank	Black	Hispanic	Asian-American	U.S. Total
Tenured	(1,829)	(1,427)	(735)	(107,580)
Professor	50.5	44.5	47.2	55.4
Assoc. Professor	41.8	42.7	45.7	38.8
Asst. Professor	4.0	6.5	2.3	3.0
Instructor/Other**	3.7	6.3	4.8	2.7
All Ranks	61.5	65.5	64.9	70.9
Not Tenured: Tenure Track	(821)	(533)	(287)	(29,095)
Professor	3.3	1.3	2.8	2.7
Assoc. Professor	23.6	9.6	10.8	16.3
Asst. Professor	71.6	87.1	86.4	79.5
Instructor/Other**	1.4	2.0	-0-	1.1
All Ranks	27.6	24.5	25.4	19.2
Not Tenured: Nontenure Track	(238)	(189)	(101)	(11,837)
Professor	8.4	2.1	9.9	8.7
Assoc. Professor	18.9	36.5	8.9	15.7
Asst. Professor	37.8	37.6	35.6	35.3
Instructor/Other**	34.9	23.9	45.6	40.4
All Ranks	8.0	8.7	8.9	7.8

* Percent may not add up to 100 because no-report cases are excluded.

† Includes only S/E and Humanities doctorates.

** Includes administrators, adjunct professors, and other unidentified ranks.

Source: National Research Council, Survey of Doctorate Recipients, 1985.

and the national tenure rate. At the associate level, nontenured Black faculty had substantially higher percentages in tenure-track positions than did nontenured Hispanics or Asian Americans. Hispanics and Asian Americans in tenure-track positions were more concentrated at the assistant level.

Although the percentages of faculty who were not tenured and who were in non-tenure-track positions were similar among minorities, Hispanics were more likely to be in the assistant or associate ranks than Blacks and Asian Americans, who were clustered in off-ladder or assistant-professor positions. The higher percentages of Asian Americans in off-ladder positions seem reasonable since many Asian Americans were possibly in non-tenure-track research positions, and have a higher representation in community colleges; moreover, because of their higher participation in postdoctoral studies, they are often hired as instructors and teaching assistants working with senior faculty in undergraduate courses. However, for Black and Hispanic faculty, these findings suggest that tenure may have been denied because more faculty in both groups were at the rank of associate professor, which usually carries tenure. A cross-sectional analysis, however, does not tell the whole tenure story.

A longitudinal analysis using a slightly different sample* provides a more complete picture of tenure, highlighting well-defined race/ethnic and tenure-status differences over time among full-time faculty who were nontenured in 1977 (Table 5.13). Except for Black faculty, in 1981, Asian Americans and Hispanics were tenured well above the national rate. Although

* Analyses based on this sample are not strictly comparable to analyses based on the sample of Ph.D.s educated in U.S. and Puerto Rican mainland secondary schools.

neither Blacks nor Hispanics were tenured at rates comparable to Asian Americans, a larger percentage of Asian Americans were in non-tenure-track appointments, which might be soft-money research positions.

Although there are no confirming data, faculty who failed to report their tenure status were assumed to be nontenured. Some stayed in academe, others left. In 1981, Black faculty numbered (11.1 percent) the largest percentage who left academe, a rate that was about equal to the national average (11.7 percent). Generally, tenure is granted after being in rank for 6 to 10 years. After nine years, most faculty in this sample should have attained tenure status. Table 5.13 reveals that, in 1985, race/ethnic disparities declined somewhat, although Asian Americans still led other groups in the percentage of faculty who were tenured. Asian Americans, with nearly 80 percent of their faculty tenured, also had the lowest non-tenure rate. Among Asian Americans who failed to report on tenure, nearly all had left academe by 1985.

Table 5.13: Tenure Decisions in 1981 and 1985 of Full-Time Minority Faculty in 4-Year Colleges and Universities Who Were Not Tenured in 1977: U.S. Citizens* (in percent)**

Total Number	Black (428)	Hispanic (527)	Asian-American (404)	U.S.† Total (33,969)
Tenure Status:		**1981**		
Tenured Faculty:	43.5	51.4	63.4	48.0
Nontenured Faculty:	50.7	41.1	31.2	39.7
Tenure Track	(30.8)	(28.0)	(8.7)	(21.6)
Nontenure Track	(9.8)	(11.8)	(17.6)	(13.7)
No Report on Tenure:				
In Academe	1.2	-0-	1.5	1.1
Left Academe	11.1	7.2	4.0	11.7
		1985		
Total†	Black (320)	Hispanic (404)	Asian-American (338)	Total (27,903)
Tenured Faculty:	66.2	69.1	79.0	66.6
Nontenured Faculty:	17.8	23.3	13.0	16.3
Tenure Track	(11.6)	(5.0)	(2.4)	(5.2)
Nontenure Track	(6.3)	(18.3)	(10.7)	(11.1)
No Report on Tenure:				
In Academe	6.2	2.0	.6	3.0
Left Academe	9.7	5.7	7.4	14.4

* Includes native-born and naturalized citizens.

** Percent does not add up to 100 because respondents who failed to report on track status are excluded.

† The total in 1985 excludes nonrespondents and Ph.D.s in education and the professions.

Source: National Research Council, Survey of Doctorate Recipients, 1977, 1981, and 1985.

The Black tenure rate was virtually equal to the national average, and most who were nontenured were in tenure-track positions. Moreover, the shift among minorities shows that, although more Hispanic than Black faculty were tenured, larger proportions of Hispanics were still not tenured by 1985, and the percentage in tenure-track positions had dropped dramatically since 1981. Blacks failing to report on tenure remained in academe at levels higher than the national average in 1985.

Employment Status of Nontenured Faculty

Most faculty who are denied tenure are either forced to leave or voluntarily leave academe. Those who do not leave academe usually transfer to non-tenure-track positions at the same institution or to faculty appointments in other institutions. Roughly 15 percent (not shown) of the faculty who did not receive tenure in 1977 and who did not respond to the 1981 survey were not included in the analysis and are believed to have left higher education. Most nontenured faculty, however, remained in academe and were fully employed.

For example, Table 5.14 shows that, by 1981, a small percentage of Hispanics and Blacks had left four-year institutions to take jobs in two-year colleges and medical schools, but most remained in the same or other four-year institutions. Those who left academe took jobs primarily in business and industry; considerably more nontenured Blacks and, in particular, Asian Americans were attracted to job opportunities in these fields. Hispanics were about equally attracted to jobs in business/industry and government.

Table 5.14: Employment Sites in 81 and 85 of 1977 Nontenured Full-Time Faculty* (in percent)**

Employer	Black		Hispanic		Asian-American		Total	
	1981	1985	1981	1985	1981	1985	1981	1985
	(241)	(116)	(256)	(125)	(146)	(71)	(17,005)	(9,022)
Edu. Ints:								
2-Yr.	1.2	-0-	3.1	-0-	-0-	-0-	1.0	1.5
4-Yr.	20.0	28.4	8.2	8.0	11.6	5.6	18.9	15.0
Univ.	59.7	44.0	71.1	71.2	67.8	53.5	52.1	34.6
Med.	1.6	-0-	.8	2.4	-0-	-0-	2.4	1.9
Bus./Ind.	9.5	16.4	7.0	5.6	17.1	12.7	14.6	31.3
Govt.	5.4	4.3	7.8	12.8	3.5	14.1	6.0	9.0
Other	2.6	6.9	2.0	-0-	-0-	14.1	5.0	6.7
	100	100	100	100	100	100	100	100

* Excludes Ph.D.s in education and professional fields.

** Includes native-born and naturalized U.S. citizens in four-year college or university.

Source: National Research Council, Survey of Doctorate Recipients, 1981 and 1985.

Because of the "up or out rule" in many institutions, larger percentages of nontenured minorities left academe between 1981 and 1985 than in the previous five-year period. In actual numbers and proportions, more nontenured Hispanic and Black than Asian Americans stayed in academe. Except in two-year institutions, the proportions of Hispanics who stayed in academe remained constant. Black proportions rose by over 8 percent in four-year colleges but declined by over 15 percent in universities. Asian Americans declined in all four-year institutions. One interesting finding is that, compared to the national rate (47 percent), Asian Americans (40.7 percent) were the largest group among nontenure faculty to leave academe after nine years. Decidedly fewer Blacks (27.9 percent) and Hispanics (18 percent) left academe, choosing instead to remain in higher education as nontenured faculty, which implies that Black and Hispanic doctorates are more dependent than Asian American or White doctorates on academe as a primary source of employment.

Business and industry appear to provide an attractive employment alternative to academe for Black and Asian American Ph.D.s; however, in 1985, of those who left, Asian Americans

distributed themselves about evenly in jobs in the government and "other" employment sectors. Hispanics more frequently sought job opportunities in government to begin their post-academic careers.

Summary

Between 1975 and 1985, there were incremental increases in minority appointments to full-time faculty positions. One-third of all Black S/E and humanities Ph.D.s were employed as full-time faculty in traditionally Black institutions. Off-ladder appointments, although a small fraction of all faculty appointments, increased over the decade and were more likely to be held by minorities employed in two-year institutions, particularly among Asian Americans.

Most minority faculty appointments were in the social sciences and humanities departments, except for Asian Americans, who were as likely to be employed in the life sciences as in the social sciences. With minor exceptions, appointment patterns in the various disciplines were similar in two- and four-year institutions.

The median salaries for minorities in academe were considerably lower than comparable salaries earned by members of their groups who were employed in non-academic employment sectors. Within race/ethnic groups, varying degrees of disparities between academic and nonacademic salaries ranged from 16 to 24 percent. With few exceptions, salary disparities increased with increasing years since the Ph.D. However, when examining the earnings of race/ethnic groups by sector, in academe, we find that Black Ph.D.s earned comparatively higher salaries than Hispanics or Asian Americans, but their salaries were comparatively less than these groups in the non-academic sector.

Teaching was the primary work activity of Black and Hispanic faculty, while Asian Americans more frequently reported being engaged in research. Blacks and Hispanics were also more likely than Asian Americans to be involved in administration. Few Black faculty reported that they were engaged in research. Promotion and tenure outcomes revealed remarkably consistent patterns. Longitudinal analyses that followed faculty over a nine-year period revealed that Black faculty were less likely to be promoted or tenured at the same rate or in the same time-span as Asian Americans or Hispanics, who had promotion and tenure rates that were higher than the national average.

In 1985, the majority of minorities who were not tenured remained in academe. Of those who left, proportionally more were Asian Americans, who, along with Blacks, were more likely to take jobs in business and industry, while Hispanics more often took jobs in government.

This study described the postdoctoral employment status of minority Ph.D.s, with primary emphasis on those in the academic labor market. Covering the years from 1975 to 1986, the study presented trend data about the characteristics of the minority doctorate pool, their post-graduate career progress, and the state of minority recruitment and retention in academe. The conclusions drawn here are based on those analyses.

This section discusses the meaning of these trends for the future of underrepresented faculty in higher education. Policy initiatives and recommendations are discussed and organized around those sectors directly responsible for implementing change: colleges and universities, and state and federal governments.

The most compelling finding in this study is that the underrepresentation of race/ethnic groups on U.S. college and university faculties cannot be oversimplified as a 'minority' problem or even a 'non-Asian-American minority' problem. The problems associated with race/ethnic status are far more complex and are related to differences in the supply and flow of potential faculty in and through the academic system, the nature and extent of which differs by race/ethnic group.

Black Underrepresentation: Conclusions

The findings show that although they are the largest group in the minority doctoral pool, Black Ph.D.s have the most fragile status of all minorities and their participation in academe is, at best, marginal. Specifically:

- The Black doctorate pool is shrinking: in absolute numbers and proportions, the Black doctoral pool has declined to its lowest point since 1975 and shows no signs of recovery.
- In addition to the shrinking, a smaller percentage of the Black doctorate pool is choosing academic careers: even though academe still claims the largest share, more Black Ph.D.s are opting for careers in business and industry.
- Blacks have the lowest faculty progression and retention rates in academe: they are promoted and tenured at lower rates than any other group. Thus, the problem of underrepresentation of Black faculty is one of supply and flow into and through the academic pipeline.

Supply Status

There is no question that the inadequate supply of Black doctorates begins quite early in the pipeline, producing higher attrition as they advance in the higher education system (Brown, 1987). The trends in these declines for Black students correspond to several public policy decisions that may be directly related to reductions in Black enrollment and retention. From 1970 to 1981, for instance, cutbacks in the Federal budget show that graduate financial assistance (i.e. fellowships, scholarships, traineeships) dropped from $436 million to $215 million (Froomkin, 1983). By 1984, Federal assistance dropped again, this time to $140 million (Hauptman, 1986). In 1975-76, less than one-fifth of student aid was in loans; however, by 1985-86, loans represented almost one-half of aid for loans and grants from all sources (Nettles, 1987; Raspberry, 1987).

The link between declines in Black Ph.D.s and financial cutbacks can be seen in Table 6, which shows that between 1976 and 1986, the number of Black students receiving financial support for graduate education dropped almost 10 percent in federal fellowships and traineeships, from 16 to 3 percent in G.I. Bill support, and from 25 to 7.6 percent in national fellowships. During the same period, guaranteed student loans rose from 12 to 35.5 percent, and personal and family contributions rose about 12 percent from their lowest point in 1978.

Table 6: Sources of Graduate School Support for Black Doctorates: U.S. Citizens, 1976-1986 (in percent).

Source of Support	1976	1978	1980	1982	1984	1986
Fed. Fell./Traineeship	30.2	19.3	19.1	17.9	17.7	20.5
G.I. Bill	15.9	11.7	6.5	5.8	5.2	3.3
National Fellowship	25.3	24.6	26.6	23.7	10.4	7.6
Self/Family	77.5	73.9	85.2	81.3	81.0	86.0
Guarant. Stud. Loan	16.9	12.9	18.8	16.2	25.0	35.5
Other Loan	14.1	12.8	16.0	18.2	20.3	15.6

Source: National Research Council, Summary Reports, Doctorate Recipients From United States Universities, 1976-1986.

What is most alarming is that Black men appear to be more affected by these trends than Black women. Among other reasons, some believe that Black men do not receive the same kind of financial support as women from family or institutions (Rasberry, 1987). Their declines since 1975 have been dramatic. For example, in 1975, 650 men were awarded Ph.D.s out of a pool of 999 Black graduates; in 1986, only 320 men out of 820 received Ph.D.s. The increasingly short supply of Black men in higher education, particularly at the graduate level, has caused the United Negro College Fund presidents to view this as "the most serious problem Blacks face in higher education" (Rasberry, 1987). They fear that this situation will lead to adverse consequences for recruiting Black men into faculty positions that are associated with academic and professional success.

Although Black women appear to have benefited relatively from the shift in sex-ratio, in no way are Black women Ph.D.s graduating in record numbers. This can be seen by comparing the 499 women who graduated in 1986, when they were 61 percent of the pool, with the 506 women who received doctorates in 1980, when they were 50 percent of the pool. Thus, although Black women appear to be making progress, in fact, both women and men are being affected by the shortage of Blacks in the doctorate pool.

Flows into Academe

The analyses in this report show that Black faculty are still entering academe at higher rates than the national average. But, even if the Black doctorate pool is substantially increased, there are several problems associated with recruitment of Blacks into academe and, once in the system, with their retention. First, there is the issue of labor market demand. With the current oversupply of new Ph.D.s and a residual pool of experienced Ph.D.s employed outside academe filling available positions, employment in academe is highly competitive. For Black

Ph.D.s, the competition has intensified and is complicated by the tradition of Black doctorates specializing in fields (e.g., social sciences, education) where the academic labor market is the least active and where a larger proportion of demand is due to attrition rather than growth (Syverson and Forster, 1984). It is not surprising to find that Black Ph.D.s who work part-time or outside of their Ph.D. specialty do so because they are unable to find full-time jobs or employment in their field.

Even so, in 1986, Blacks generally had higher than average percentages of Ph.D.s with committed plans to enter academe, and their proportions could possibly be higher if more job openings were available. The fact that 70 percent of all Black Ph.D.s were employed in academe shows that most highly-trained Black Ph.D.s are still following the tradition of seeking employment in higher education.

A second reason for the outflow is that Black Ph.D.s are seeking and taking job opportunities in sectors other than academe where employment is sometimes more available and salaries more attractive. Even though the median salaries of Black faculty are higher than other faculty groups, their earnings are still substantially lower than the earnings of their counterparts in private industry. Black Ph.D.s are responding to employment opportunities that offer more attractive careers, both in terms of fulfillment and remuneration. Finally, one could speculate that, in addition to labor market conditions, the lack of aggressive recruitment, support for retention, and Blacks going into business and industry may be part of the explanation for the plummeting supply of new Black Ph.D.s and their declining entry rates into academe. For example, the sharpest drop — between 1982 and 1983 — occurred five years after the Supreme Court ruling in 1978 in the case of *Bakke* vs. *Regents of the University of California* that struck down the special minority admissions program at the University of California's Davis Medical School. Some educators believe that this decision marked a pivotal point in the reversal of affirmative action policies in many colleges and universities, and is linked to the current downturn in Black graduates as well as Black faculty (*The Chronicle of Higher Education*, 1986).

Retention of Faculty

These findings confirm what many colleges and universities already know: recruiting and keeping Black faculty are not synonymous. Although Black Ph.D.s are primarily employed in four-year and predominantly White institutions, once in the system, their outflow from higher education appears to be associated with the winnowing processes of promotion and tenure.

One can speculate about the reasons for their higher attrition rates: fewer Blacks take postdoctoral appointments prior to taking faculty positions, which prevents them from developing research skills and building publication records early in their careers; Black faculty are primarily engaged in teaching, which, as many junior faculty realize too late, may not figure as prominently as research and publications in academic reward systems; promotion and tenure processes are not open to scrutiny and, therefore, the criteria used for these decisions are not always clear nor defensible. Another reason may be the lack of job security in academe, where the percentage of tenured faculty ran between 63 and 68 percent in 1980 and is estimated to run 70 to 75 percent in the mid-1980's (Bowen and Schuster, 1986). The tight labor market may discourage new Ph.D.s from entering academe, particularly minorities (Shapiro, 1983). This is particularly true in the social sciences, where Black Ph.D.s are concentrated. This study also revealed that one-third of all Black social scientists in 1985 were working outside their Ph.D. field. Moreover, Black Ph.D.s often find themselves selected for service roles on multiple committees to promote cultural diversity. Many are also selected for administrative roles. Neither of these roles lead to retention in the system (Staples, 1986).

With less emphasis being placed on affirmative action, retention is a critical factor in the severe shortage of Black faculty on U.S. campuses.

Hispanic Underrepresentation: Conclusions

Although Hispanics have marginally increased their representation in the doctorate pool, the conclusions reached from these findings are that:

- The underrepresentation of Hispanic faculty is due to a low growth rate in the Ph.D. pool that has always been small relative to their representation in the general population.
- Although Hispanic Ph.D.s are entering academe at rates higher than the national average, fewer Hispanics are going into academe compared to their rates in 1975.
- Hispanics faculty in S/E and the humanities tend to be promoted at higher than average rates from associate to full professor; longitudinal analyses show that over a nine-year period, however, slightly more Hispanics than Blacks and Asian Americans remained at the assistant professor level or moved to positions with non-faculty status.
- In the aggregate, the Hispanic tenure rate is below the national average; however, a followup of a national sample of faculty over 9 years showed that the Hispanic tenure rate was higher the national average.

Supply Status

Similar to Blacks, the underrepresentation of Hispanic faculty is caused early in the pipeline by the higher dropout rates among Hispanic high school students and by their overrepresentation in two-year institutions that have low transfer rates to four-year colleges and universities (Brown, 1987). Hispanics have the highest dropout rates at all levels of the educational system. Brown's (forthcoming) study of students in the mathematics, science, and engineering pipeline shows that, among high school students, dropping out of school is more common among Hispanics than among Blacks and Whites. Among college students who intend to major in mathematics, science, and engineering, Hispanic students are especially hard hit with proportionally more students from this group dropping out of undergraduate school. Thus, fewer are prepared or available to enter graduate school.

Unlike the Black pool, however, the sparse Hispanic pool is not aggravated by falling numbers in the doctorate pool, but by the fact that they have made only small, incremental gains in their share of the doctorate pool. If Hispanics could substantially increase the number of students entering undergraduate and graduate school, and thereby, increase their Ph.D. production rate, they might be able to reach parity without major interventions to increase their flow through the faculty pipeline. More Hispanic doctorates, however, will need to shift into science and

engineering fields to increase their representation in these academic departments.

Flows into Academe

Although the proportion has declined, the majority of Hispanic Ph.D.s still enter the academic employment sector. Currently, their entry rates are about the same as Black entry rates, which are higher than the national average. One possible explanation for some of the decline in the proportion with commitments to enter academe, may be Hispanic field choices. Like those of Black Ph.D.s, their chosen fields tend to be in academic areas with declining hiring activity (i.e., social science, humanities), where job openings are more dependent on attrition than on growth. Thus, they encounter stiff competition in the academic labor market.

Except for Asian Americans, a higher proportion of Hispanics take jobs in two-year institutions. While this is understandable, given the high Hispanic enrollments in two-year institutions, their employment in two-year institutions reduces their presence in graduate-level institutions where they can serve as role models and mentors for Hispanic students who are more likely to pursue graduate study. Thus, the pool from which Hispanic faculty are recruited must not only be enlarged, but must also be drawn into four-year research institutions.

Promotion and Tenure of Faculty

Hispanic faculty in four-year institutions are promoted in higher proportions and have fewer problems than Black faculty, particularly in promotions from associate to full professor. Indeed, Hispanic promotions to this academic rank exceed the national rate, indicating that after first-rung promotions, Hispanics do quite well in the academic hierarchy; however, these results may be influenced by the fields (i.e., S/E and humanities) examined in this study. Although Hispanics do quite well in the S/E and humanities fields, it is impossible to assess from the available data how well Hispanic faculty in education departments or professional schools might fare in promotions.

The same argument can be made for tenure. The findings reveal that Hispanic faculty in the S/E and humanities departments did quite well among faculty who were tenured, with rates that were higher than the national average. Yet, inferences about their tenure rate in education and the professions cannot be made from these findings.

Asian-American Representation: Conclusions

We have seen that Asian Americans continue to be unique among minority doctorates and, as such, had very different outcomes:

- Asian-American doctorates in S/E and the humanities are well-represented in the doctoral pool. Moreover, Asian Americans are highly concentrated in fields such as engineering and computer sciences that currently have high growth rates in academe.
- Despite their field choices, Asian-American Ph.D.s enter academic employment at much lower rates than other minority groups and their entry rate is below the national average. The proportion of Asian Americans who enter business and industry almost equals the percentage going into academe, and in the physical sciences, it substantially surpasses those with plans for academic careers.
- In the aggregate, the promotion and tenure rates for Asian Americans are lower than the national average but higher than for other comparable minority groups. Further, those Asian Americans that enter academe are promoted and tenured at higher rates and in less time than all comparable faculty groups.

Supply Status

Asian Americans are well represented in the national Ph.D. pool and are concentrated in S/E fields. The only areas where they are underrepresented are in low-growth fields such as education, the social sciences, humanities, and the professions. The Asian-American doctorate pool has grown over the past decade at higher rates than any other minority group. Thus, although their interest in academe is limited, the production of Asian- American Ph.D.s is more than sufficient to supply faculty to the academic labor force.

Flows into Academe

The critical difference between Asian Americans and other minority Ph.D.s is that comparatively fewer Asian Americans opt for careers in academe. In 1986, slightly over one-third of new Asian-American Ph.D.s had confirmed plans to enter academe and their entry rates have been consistently low. Most Asian-American doctorates cast their lot in the business and industry sector where career opportunities are expanding and the monetary payoffs are higher.

Implications and Policy Directions

The findings in this study call attention to directions for shaping future policy initiatives affecting the supply and buildup of faculty from underrepresented minority groups. Two points can be made from the outset: First, everyone generally concedes that something must be done about the problem of underrepresented minority faculty on U.S. campuses, but, this issue has not received top priority on the agenda of institutions and organizations in higher education or in state and federal governments (*Black Issues in Higher Education*, 1987). Second, to ignore the problem of the decline in Black Ph.D.s and faculty is to delay finding solutions to a problem that could have serious future national consequences in higher education as well as in other major sectors of the economy. By 2020, minority students will comprise about 35 percent of the total U.S. student population, with Black and Hispanic students making up the largest share of this group. Current policies and practices are not working to expand the Black and Hispanic doctorate candidate pools and therefore will not meet the mentoring and role-model needs of the changing mix of students anticipated in higher education in the future.

Recommendations to Increase Supply

The following policy recommendations are directed toward enlarging the supply of Black and Hispanic Ph.D.s. However, the recommendations presented are not those of the Graduate Record Examinations Board or Educational Testing Service. Many are familiar to both higher education and state and federal governments but they must be given priority on agendas in all sectors. For example:

- The problem of declining Black student enrollment must be included as a major issue in the political agendas of state and national election platforms. The improvement of precollege preparation is essential to the greater participation and retention of Black and Hispanic students in higher education. Public and private industry must be made aware of the serious consequences of failing to address a problem that has a national impact on all social institutions and the future of the nation's economy.
- State policies for financing minority students' graduate work must be developed and expanded to include "forgiveness" clauses if candidates teach at the college level.
- Since the pool of Black Ph.D.s continues to lose members, particularly men, Black participation at all levels of higher education must be increased. The sparse Hispanic pool also must be increased.
- Since the majority of Black doctorates received their undergraduate training at TBIs, state and federal funds should be increased to strengthen these institutions, particularly TBI programs in the sciences and engineering. Federal student aid programs must reverse the trend from loans to grant programs so that higher education can, once again, become accessible to Black and Hispanic students.
- The development of networks similar to TBI/TWI consortia programs can be used to bridge the transition between 2- and four-year institutions. The enrollment of minorities, particularly Hispanics, might be substantially increased by encouraging private industry to make financial commitments for the advanced study to minority students transferring from two- to four-year institutions. A partnership between private industry and higher education is needed to enable more talented minority students to complete four-year undergraduate programs, and thereby give more Black and Hispanic students the opportunity to enter graduate programs leading to the doctoral degree.

In addition to making vital improvements in the precollege preparation of Blacks and Hispanics and successfully attracting and retaining them in higher education, the best yield will come from encouraging minority undergraduates, particularly Black men, to enter graduate programs that lead to academic careers directly after the baccalaureate degree. To achieve this goal, we recommend:

- The creation of consortia between the graduate schools of traditionally White institutions (TWI) and TBIs, whereby talented students from TBIs would be provided with financial assistance and social support to pursue and persist in graduate programs (e.g., the Ohio State University model). Similar consortia arrangements to increase the number of Ph.D.s among Black faculty at TBIs should be enhanced by providing financial support to them while they earn doctorate degrees at TWIs. Although many institutions have tried to establish consortia arrangements between TWIs and TBIs, the key to successful consortia arrangements is the institutional commitment to increase minority participation in these programs and adequate financial support.
- To encourage minorities to begin graduate study immediately after the baccalaureate degree, federal and state financial assistance in the form of grants should be provided for minorities who indicate an interest in an academic career so that they can enter graduate programs on a 'substantial' (e.g., six to nine credit-hours per semester) part-time basis. To discourage dropping out, these grants should convert to repayable interest-free loans if the individual fails to complete the program in a reasonable time-span under the part-time schedule.
- An increase in the sources of national voluntary programs providing portable fellowships to minorities for graduate and postgraduate study. Special fellowships should be created for individuals planning academic careers so that adequate financial aid is available to recipients in fields where minorities are underrepresented.
- The development of programs to shift Black graduate students' career interests from low-growth fields such as education to high-growth fields such as science and technological fields. Greater exposure to these fields should begin early in the educational pipeline, with continued encouragement after high school in the form of financial packages that would attract minorities to these fields.

Recommendations for Recruitment and Retention of Minority Faculty

The other major area on which these recommendations focus is the attraction and retention of minority faculty in academe:

- Some programs boasting successful recruitment of minority faculty place considerable emphasis on affirmative action programs that aggressively recruit minorities and that go beyond mere equal opportunity employment practices and policies (*Black Issues in Higher Education*, 1987a; 1987b). To do less will keep underrepresented groups in their same relative positions in academe, particularly in a tight labor market. Affirmative action strategies to increase minority participation should include incentives, such as, additional tenure-track positions a competitive basis to departments that are willing and able to attract minority faculty candidates, taking into consideration academic field, program needs, and student enrollment.
- Institutions should devise plans to attract and expand minority faculty by offering a combination of programs and salary incentives that are competitive with those of business and industry. A major attraction would be to establish academic centers focusing on minority culture, history, and policy issues that would meet the interest of minority scholars and provide them with facilities and resources to conduct research and scholarship in areas of their interest. These centers would also provide graduate training for minority and majority students who are interested in conducting research in the area of race/ethnic studies.
- Colleges and universities must establish institutional initiatives to retain Black faculty. Vital strategies must include ways to encourage and support junior faculty to build research and publication records early in their careers to facilitate promotion and tenure. Postdoctoral appointments should be encouraged, supported, and, if necessary, supplemented with institutional funds that would obligate the faculty member to provide a specified period of service after completing the postdoctoral appointment. Special efforts should be made to provide released time from teaching so that junior faculty can strengthen their research and publication records.

A Future Research Agenda

There are important research gaps that, if filled, would better inform future public policy, effecting the supply and expansion

of underrepresented minorities in the faculty pool. First, there is a need for more precise answers to the question of why minorities — particularly Black men — are losing interest in graduate training and academic careers. A more precise model and additional data would identify the reasons given by respondents as to why they chose academic or nonacademic careers and why they left academe.

Second, since the majority of Ph.D.s are employed in traditionally White institutions and are a key factor as role models and mentors for future doctoral students, the comparative advantages and disadvantages of Black doctorates working in traditionally Black institutions and traditionally White institutions should be examined. For instance, what is the relative survival rate of minority junior faculty in TBIs vs. TWIs? Are there significant differences in the time-span for promotion and tenure?

Third, more federal funds should be provided to enable the National Research Council to expand their current surveys to include doctorates in education and the professional fields. These data are essential for understanding the status and career progress of Black and Hispanic doctorates in fields where their participation rate is high and would permit a more complete examination of promotion and tenure rates among Black and Hispanic faculty in academe.

Fourth, the shifting sex-ratio among Black Ph.D.s calls for a gender analysis of the postgraduate experiences of Black doctorates. Of particular interest is the effect of gender on the movement away from academe, but more importantly, the association between gender and the lower promotion and tenure rates observed among Black faculty.

Finally, there is a compelling need for a research project to identify and assess institutional programs that are successful in attracting and keeping minority faculty; these institutions could provide effective models that could be emulated by other institutions.

While these research questions are not exhaustive, they touch on vital issues that are important to the formulation of future public policy to increase minority access to and equity in academe.

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